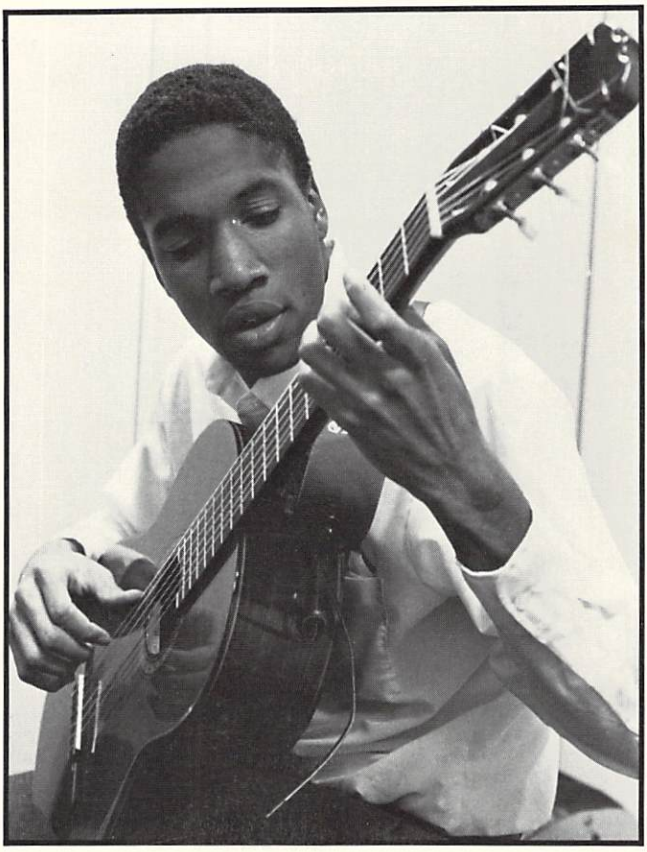
UAA Student Showcase Journal
Recognizing Excellence

Vol. 5 No. 1 Spring, 1990



University of Alaska Anchorage
Anchorage, Alaska

ACKNOWLEDGEMENTS OF THE 1989 SHOWCASE AND 1990 JOURNAL

Union of Students, University of Alaska Anchorage

UAA Faculty, Staff and Students who contributed time and effort to making the 1989 Showcase and the 1990 Journal a success

Phi Alpha Theta, History Honor Society

ABOUT THE JOURNAL

The UAA student journal will be published annually. It will consist of a number of top-ranked research articles and creative works selected from papers presented at the annual *UAA Student Showcase* held in the spring of the year prior to journal publication. An attempt will be made, if possible, to include a wide campus representation, as well as papers that will be of value to the community and the state. This is the fifth published journal.

Copies of the journal are available for $5 from the UAA Student Showcase Journal Editor, Student Development Department, UAA, 3211 Providence Drive, Anchorage, Alaska, 99508. For further information call (907) 786-4791.

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Recognizing Excellence

Vol. 5 No. 1 Spring, 1990

University of Alaska Anchorage
Anchorage, Alaska

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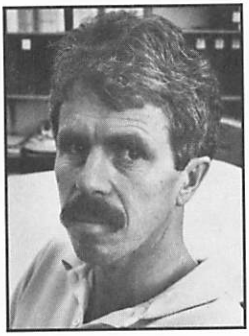

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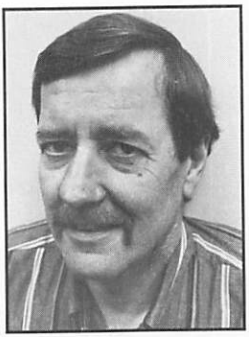

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*Editors not shown were unavailable at the time of the photo session.

UAA STUDENT SHOWCASE JOURNAL
RECOGNIZING EXCELLENCE

Vol.5 No.1 Spring, 1990

ABOUT THE CONTRIBUTORS

Richard Chiappone (Things That Come to Mind) is a full-time undergraduate student majoring in English with an emphasis on creative writing. He has been honored three times by the UAA/Anchorage Daily News Creative Writing Contest. He contributes articles regularly to Alaska Outdoors magazine, and has had material accepted for publication in Gray's Sporting Journal and Fly Fishing Heritage.

Joann Congdon (The Carriage Trap) graduated from Seattle Pacific College in 1972, with a B.A. in English. She taught elementary school until she had children. Joann now works as a bookkeeper for her husband's law practice, and is in the M.F.A. program at UAA.

Lynda Lu Hall ("Jingle Jive" A Rhyme and Rhythm Approach to Teaching Basic Math Facts 1-10 for the Slow Learner/Special Education Student) graduated from Pacific Union College in Angwin, California, in 1971 with a B.S. degree in Physical Education. After teaching for four years in California and Washington, she moved to Alaska and taught elementary school for three years. In 1983 she began attending UAA seeking a double major, Nursing Science and Elementary Education. Lynda Lu plans to pursue a M.S. in Nursing Science following her graduation from UAA in 1989.

Mary Gilbert Howard (Lawrence Henry Gipson and the American Revolution) is a senior at University of Alaska Anchorage with a major in History. She is a full-time employee at Muldoon Christian School. She is married and has four children and two grandchildren. Her goal is to complete her education degree that was started at the University of Washington.

Janet Keim (The Alchemy of David Felkner and Art Provera) graduated from the University of Alaska Fairbanks with a B.A. in Art in 1968. She has also taken interior design courses at the University of Washington and Anchorage Community College. She has decided her strongest interest and ability is in fine arts, so she has returned to school to study sculpture. She has been taking classes with Ken Gray for a year at UAA.

Robin L. McClymonds (Fat Utilization Enhanced by Endurance Exercise and Cold Exposure) graduated Magna Cum Laude from UAA with B.S. in Human Performance Specialization from the College of Nursing and Health Sciences in 1989. She served as the Health Science student representative and is currently serving as the Alaska Regional Chapter student representative on the National American College of Sports Medicine Student Affairs Committee. As an active member of the Arctic Sports Medicine Institute, she has been involved in psychological and physiological measurements of Iditarod mushers since early 1988. She has been included on the National Dean's List three years and during the last two years was recipient of UAA Tuition Waiver Scholarships for Academic Excellence. Her academic goal is to obtain a degree in Physical Therapy at the graduate level.

Patrice Parker (End of Summer) was born and raised in Juneau, Alaska. She attended Vermont College in 1971-72. In the past, she has worked for the Alaska Legislature, the Alaska Public Interest Research Group, and Trustees for Alaska. In 1988 she opened a small business, Alaska Travelling Salmon, a seasonal retail concession. Married, with three children, Patrice began work on a B.A. in English at UAA in 1983 and will graduate in May.

Debra Pearson (An Economic Critique of Alaskan Resource Disposition) has lived in Alaska for four years and attended the University of Alaska Anchorage for three years. She has received a Bachelor of Business Administration in Economics and plans to enroll in the Ph.D. program at the University of Colorado, Boulder in the fall, 1989.

Nick Ronan (An Economic Critique of Alaskan Resource Disposition) has attended University of Alaska Anchorage for two and one-half years, 1986-1989. He plans to attend graduate school at the University of California Santa Barbara in the fall, 1989.

Liesl Schernthanner (An Economic Critique of Alaskan Resource Disposition) came to UAA, fall semester 1985 from Sun Valley, Idaho. While attending school, she was a member of the varsity alpine ski team, four-time participant in NCAA championships, 1989 All American, and team co-captain during the 1988-1989 season. She graduated from UAA in May 1989 with a Bachelor of Arts in Economics and a Minor in History.

Stephan F. Stevens (Feasibility of Method: Automated Code Translation Using Formal Language Definition) was born in Queens, New York. He was brought to Alaska by the U.S. Air Force in 1976 and served for four years operating a satellite communications facility on Elmendorf Air Force Base. After graduating from U.S.A.F. technical school, he obtained a General Education Diploma from the State of Alaska. He repaired computer hardware during his off-duty time and became familiar with software development after being discharged. In 1984, he obtained a position as computer system manager in a local data processing center and enrolled in the University of Alaska at Anchorage. Five years later, Stephan graduated with a Bachelor of Science degree in Computer Science (scientific option). Currently, he is developing a general-purpose computer source-code translation tool using the findings from his Student Showcase paper.

Laurie Stewart (Television as Education: Potential and Practice) graduated in May with a Bachelors degree in Psychology and Journalism. Beginning fall, 1989, she will work on her Masters in Communication at the Anneuberg School of Communications at the University of Pennsylvania, Philadelphia, where she has been awarded a tuition scholarship. She is interested in the potential role and applications of modern communications technology in society, including the role of television and video in education.

Debbie A. Storrs (Evaluation of High and Equal Status Male and Female Touchers) graduated in May of 1989 with a Bachelors in Sociology and a Minor in Psychology. She plans on entering a Masters program in Sociology at the University of Oregon in the fall of 1989. Her interests outside of school include reading, camping, and racquetball.

Christy Taylor (Effects of Looking, Smiling, and Forward Lean on Evaluations in Two-Person, Opposite-Sex Interactions) is a 38-year-old returning student in her second semester in the Counseling Psychology Master's program. She received her Bachelor's degree in Psychology in 1975 at Lamar University in Beaumont, Texas. She has lived in Cordova for several years where she became acquainted with life at sea. After working as a deckhand on fishing and research vessels around the state, she started working for the Alaska Marine Highway system where she is a purser. She has taken a leave of absence to work on her degree and continues to work seasonally.

Tara C. Wreyford (The Right Moves) earned a B.A. degree in English, with a Creative Writing emphasis from the University of Alaska Anchorage in spring, 1988. She is currently enrolled at UAA as a M.F.A. candidate in Creative Writing. She is originally from Louisiana and previously attended Louisiana Tech University and Louisiana State University, Shreveport. She has been an Alaskan resident for 14 years and lives in Palmer with her husband and two daughters. She is employed as a paralegal/legal secretary in Anchorage.

*Not all biosketches were submitted by the authors.

ABOUT THE UAA STUDENT SHOWCASE

Searching for Excellence: Conference Objective

Opportunities for intellectual and social exchanges are important functions of universities as they meet many of the developmental needs of students. Such opportunities also provide for the development of a feeling of "group cohesion" and a "sense of belonging" to a particular institution.

Established universities have well-developed structures designed to provide opportunities for intellectual and social exchanges. Universities with shorter histories, such as UAA, however, have few or no such structures to meet the above noted needs. While this problem is partly a function of the youthfulness of such universities, this has been further complicated until recently at UAA by the absence of organized on-campus housing. The campus is still, to a great extent, a "commuter" student population. Institutions with this type of population are characterized by few opportunities for campus-wide intellectual social exchanges which can produce feelings of alienation.

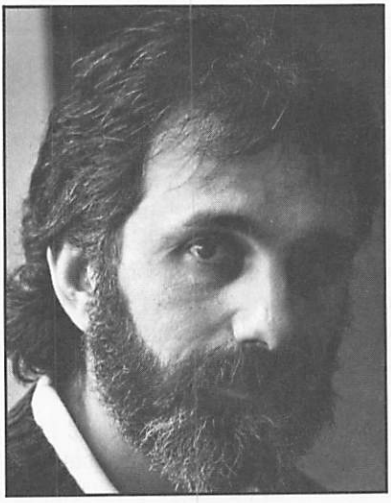
Lack of structural developments, however, should not prevent students from having opportunities for intellectual and social exchanges; such is the purpose of the annual *UAA Student Showcase.*

The potential objectives and/or outcomes of such conferences as the *UAA Student Showcase* are manyfold. First, it provides a vehicle for meeting intellectual and social needs for UAA students. Second, since the student conferences are designed similar to professional conferences, it exposes students to activities that are an important part of the academic lifestyle. Third, the campus-wide effort has the potential of developing closer ties among students, faculty, and administrators. Fourth, public presentations can serve as an incentive for students to exert more creativity and effort in preparing their papers than if they were merely fulfilling a course requirement and receiving a grade. Fifth, by involving community leaders and community members in the Showcase, a greater understanding can be gained of the relationship between UAA and the Anchorage community. Finally, as a culmination of Showcase activities, outstanding works are published in the UAA Student Showcase Journal. This provides a sense of accomplishment, recognition, and pride for the students and the university. The articles printed in this journal represent selected works from the fifth annual *Student Showcase.*

Dr. Sharon K. Araji
Showcase Founder

THINGS COME TO MIND

Richard Chiappone



My wife just walked into the kitchen and made the announcement. "We can't go to your folks' for dinner."

I really thought she'd make it this time.

I'm at the sink, just finishing a few dishes. All I can do is look at her. She's still in her robe though it's noon and we're supposed to be there shortly. The kids have been dressed for an hour, they're starting to unravel. She takes a seat at the kitchen table, frowning.

I'll never get used to this.

"I don't have any pantyhose." she says.

No pantyhose. That's a new one. But is it reason enough?

I can't think about it. I really have to avoid that. The thought of breaking the news to my parents—who've been cooking all morning, I'm sure—has to be pushed aside.

That seems a bit risky. Pushing aside a thought.

I mean, what if nothing takes its place?

Not to worry, things come to mind.

Sometimes they relate directly:

Back when my wife first started disappointing me, I went to see my father. He said, "Charlie, you expect too much, but you require too little. Too little." He rushed to add, "That doesn't mean a wife shouldn't come first. That's not what I'm saying, you understand?"

I said, "Yes." But really, what else could I say?

Sometimes things come that don't relate so directly:

My father's left foot is two sizes larger than his right; it's a lot wider.

You see what I mean?

All his life he's had to buy shoes from a special catalog. When I was a kid, I loved to imagine the feet that went into the more exotic models pictured in it. Shoes for club feet, for crooked feet, for hopelessly flat feet, toeless feet, twisted feet, bent feet. Odd, non-matching pairs: one perfectly normal, one grotesque. (I couldn't imagine anyone with two club feet.)

Richard Chiappone's paper was written for English 662, "Graduate Writers' Workshop: Fiction," Ronald Spatz, Professor, UAA English Department.

The catalog even offered single shoes. You only had to specify: L or R. I was glad for Mr. Manelli, across the street. He'd had one foot pinched off by a train wheel that lurched ahead when it was supposed to stand still for him to grease it. I can still picture a shoe lying in the oily gravel between the tracks—a shoe with a foot in it.

What a way to make a living.

The railroad gave Mr. Manelli a riding lawnmower when he got out of the hospital. Nice, but he never really learned to handle it well.

They gave his son Domenick a job for life. Very generous, considering that it was only the company's policy to do that for families of men actually *killed* on the job.

Domenick immediately got married, but continued to live across the street with his parents and his new bride.

That's the way it is. Some things move when you least expect them to, others won't budge at all.

It just occurred to my wife that I'm drifting here.

"Did you hear me? I can't go without hose."

She sits at the table, biting her nails. I take the seat across. I notice how thin she is.

"It's Easter. Where are you going to find pantyhose on Easter Sunday in this town?"

"I'm not," she says.

I can see that she's right. Unsolvable problems are sort of her hobby. That's one of those things you don't tell someone until after you're married.

"So go without," I try. "How about pants?"

"Sure, and look like a fool."

"Nobody in my family is going to care."

"You got that right. Not about me they won't."

I played right into that one.

She's pouting now. You could cut yourself on the corners of her mouth.

"Your brothers'll be there, their kids, your sister and hers. No shortage of people there."

We look at each other for a minute, one of us waiting for the other to speak, the other with nothing to say. I'm drumming my nails on the Formica. Feel myself losing it again. I just can't stay interested in a stalemate.

Here's something:

One Saturday afternoon I found my father sitting slumped over his knees on the front steps, his huge, black, accordion case on the porch above him. It looked bigger than he did. Across the street Mr. Manelli struggled to control the powerful lawnmower, as if that were his job. He crashed into his hedge again and again.

My father wore his suit. Dark blue with polished knees and elbows, dandruff on the shoulders. He had a wedding to play, but he was just sitting there, head down. I thought he was crying.

"Are you ok, Dad?"

He looked up at me and I was glad to see no tears. His eyes were just a little darker than usual maybe, the hollows circled in dark skin, as black as the graphite under his nails.

In the house, both of my little brothers cried. They'd started some time the night

before and had been at it almost all day.

"I gotta go to work, Chooch. I'm tired, is all."

He glanced at his watch, and put his forehead back down on his knees, studying his big shoe. There was a crack along one seam that showed a little sock. For months he'd talked of a new pair. But there'd been a lot of expenses lately. Measles, mumps, a variety of fevers that burned up every dollar—even with the side jobs, playing.

"Don't look so serious," he said. "This is for shoe money."

"Great, Dad," I said.

He stood and lugged the accordion case to the station wagon and wrestled it into the back.

"Help your mother if you can, Chooch," he said as he drove off.

"Well I can see you don't care about my problems," my wife says, and stalks off to the living room where the kids are still ripping through their Easter baskets.

I know she wants me to ask her what she did with the extra money I brought in last week.

I'm not sure I want to hear.

Last fall, when the girls needed back-to-school things—even though Carla's only in third grade and Angela goes to preschool—I painted my boss's garage for cash. My wife took the girls shopping. They bought lunch boxes, pencil boxes, plastic notebook covers, and some other things I'd never seen before. They had lunch, saw a movie, bought some tapes.

Their school clothes went on the Sears bill.

I said, "Well, at least you had a nice time." She said, "The movie wasn't very good."

The next job I did went to rent Halloween costumes. Sixty bucks for two small space creatures! I said, "My mother used to make us costumes." My wife didn't speak for days.

I don't even want to talk about Christmas.

Today she knows I haven't the heart to ask about the money.

"Easter candy cost plenty," she finally yells from the living room.

"Don't do this to my mother."

"What's wrong with having nice candy for their baskets?"

I can't argue with that. Candy is nice.

Even so, there are chocolate animals loose all over the house. There are chocolate rabbits, chocolate chickens, chocolate ducks. There are marshmallow eggs. Baskets of jelly beans. Bushels of plastic grass.

"Costs plenty," she says more quietly.

What can I say? "Don't ever do a nice thing for the kids again? Let the little bastards suffer!?"

I don't think so.

Certainly not on Easter.

"I'm going to paint Mrs. Sullivan's porch next weekend. We'll have a little extra," I tell her through the wall.

"Don't forget Carla's communion," comes back. "She'll be needing things."

"Shoes, I bet," is all I think to say.

And I'm off again.

My dad and I loved to browse the shoe stores—as if they might somehow have a pair for him.

He'd take a seat and pick up a display shoe (a sleek black wingtip usually), cradling it in his hands like a baby. I'd sit next to him, dizzy from the smell of leather, shoe polish, and stocking feet.

When the clerk knelt before us, my father'd push aside the sliding ruler and say, "No need to measure. What's the widest these come in?"

Whatever the man said, my father answered, "Perfect, bring me a pair in a ten. A man should know his own shoe size! Right Charlie?"

"Right, Dad."

By the time the clerk returned, my father'd already be down to his socks, reaching for the shoe horn.

He'd slip his right foot in. The left one wasn't so easy, but he'd force it somehow. Sometimes I could see the knuckles of his toes through the leather.

Then my father'd walk back and forth before the full-length mirror, drinking in the picture of himself in shoes he would never own.

After a minute he'd limp back to the chair.

"They seem a bit tight," he'd say, looking surprised.

I'd shake my head at the clerk as if to say "These will never do." The poor guy invariably took the bad fit personally.

He was only trying to do his job.

I really have to stop daydreaming for a minute. It's time to assign blame.

"If you hadn't had the truck all day, yesterday, I might have got some pantyhose." She's serious.

I could point out that Easter Sunday isn't a surprise holiday, that there is plenty of advanced notice from the Hallmark people and others, that—with the help of certain almanacs—a person could determine the date for the next several thousand years, and stock up on pantyhose and such.

Somehow I don't think that is the right approach.

"I was working, yesterday."

I hear her rustling uncomfortably on the couch.

"You take the kids and go," she says. "Nobody'll miss me. Not your mother and father."

Me and the kids? For some reason, that would be even harder to explain. And also, there is the thought of my wife sitting home alone all afternoon surrounded by chocolate rabbits. That could cost me plenty in the long run.

"No," I say. "I'll call, and tell them we're not coming."

My mother's been hurt before. A little more pain won't kill her. Only, why do I have to dish it out?

This comes up about pain:

My dad came home from playing one Saturday night with his special shoe jutting out of his coat pocket. It had a long split down one seam. The sole was flapping loose.

I'd seen him come through that door maybe a hundred times—dirty from the factory, or tired from hours on stage with the accordion in his arms—but I'd never seen him come home with a shoe off.

He just stood in the doorway, holding the accordion case in his left hand, his wide stockinged foot flattening out under the weight.

My mother said, "Anthony, why'd you wait so long?"

She bit one knuckle and made her saddest face.

My father didn't say a word. He left the case in the hallway and went down cellar without taking off his suit coat.

"Anthony," my mother called after him.

But he didn't come back up for fifteen minutes, and she didn't go down after him. When he came back up he was wearing his shoe again. It was completely wrapped in silver duct tape.

"I think it'll hold through church," he said, and he headed off to the bedroom.

Every step he took, the shoe squeaked.

"I better go talk," my mother said to me.

She kissed me good night, and squeezed past the accordion, and down the hall.

Just before dawn, the house shook.

My mother had gotten up to use the bathroom and smashed her foot into the heavy case in the dark hallway.

She sat on the accordion and howled.

When we got to her. Her right baby toe was sticking straight out sideways. As far as I knew there wasn't a shoe made to fit that.

Tears streamed from her eyes.

"Anthony, I wish you didn't have to work so much," she cried.

It's getting late. I have to do something about this.

I go to the living room, and step over the kids getting into my Lazyboy. "Angela, honey, be careful. You're getting chocolate on Carla's dress."

My wife is lying on her side on the couch. She has her legs pulled up under her robe and it looks like she has no feet. But I know she is perfectly ambulatory when she wants to be.

"What am I going to tell my folks?" I ask.

"Tell them the truth."

The last time it was "The car won't start." Before that, "I have to work." They understand those well enough. Or they act like they do.

"How come you don't want to go anywhere?" I say.

"Don't say that about me! I want to go plenty of places. There's a Disneyland in Florida now. I don't see us going there."

She says "in Florida now" as if Florida is so much closer to New York than California.

"Don't say that about me. The kids would just love Disneyland."

But she's too late. Her timing is way off.

I reach for the phone on the coffee table and dial the familiar number without thinking about it.

Not that I'm not thinking at all, mind you.

The morning my mother separated her toe, our whole family went to church directly from the emergency room. My mother wore a bedroom slipper over her wrapped foot. My father in his blue suit and wounded shoe.

We were late. The Pakistani intern had been slow filling out the report. There'd been some difficulty with the word "accordion."

We had to take the back row pew because Father Berran ran the mass like an opera—latecomers were discouraged from wandering in once the performance started. I must say his *Dominos vobiscums* were worth it.

When the time came, my father offered his shiny elbow to my mother and she limped along beside him to the communion rail. I stayed in the pew with my sister and the little ones.

My parents were moving slowly.

Before they were halfway back to our seat most people were already back on their kneelers, sucking the communion wafer out of their teeth. Even Mr. Manelli had returned and put up his crutches in the pew beside him.

My father kept a slow pace for my mother. They smiled through the sacrament's afterglow. Maybe that was just the stained glass?

Mass was crowded, as it often was in those days, but it was quiet. In the silent church, the silver-taped shoe squeaked louder than ever, and my mother's slipper flapped against the hard tile floor.

People started to look up from their prayer books, from their rosary beads. Even Father Berran waited to begin the benediction. I swear the statues turned to catch a glimpse of them passing, arm in arm, squeaking and flapping down the aisle, beaming like saints. A mother of four limping to communion on a broken toe, a man with one pair of dress shoes and a roll of tape.

To this day, I'm sure that had we been Protestants the whole room would have erupted into applause.

"What are you smiling about?" my wife asks.

I hold the phone to my ear waiting for my parents to answer.

"Just thinking about something."

"What?"

My mother's voice comes on the other end.

"Hello Ma. It's me. Listen we. . ."

"I really can't go," my wife says. "Do you understand that?"

"Hold on a minute, Ma."

I cover the phone.

Little Angela had draped plastic grass over my wife's head, and stuffed a doll into the front of her robe—only the doll's head sticks out, under her chin. My wife has closed her eyes at this, and has drawn her knees all the way up to her chest.

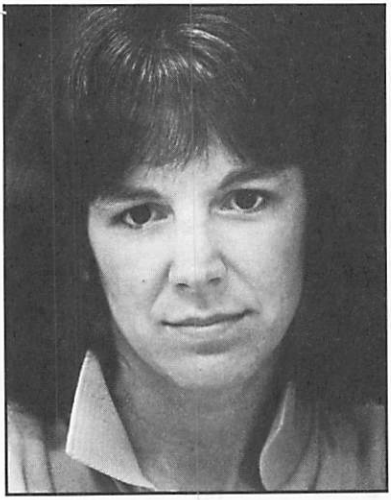
In a barely audible voice she says, "Tell her we're coming down with something."

At the moment there is nothing cluttering my mind.

I can see that she is absolutely right.

END OF SUMMER

Patrice Parker



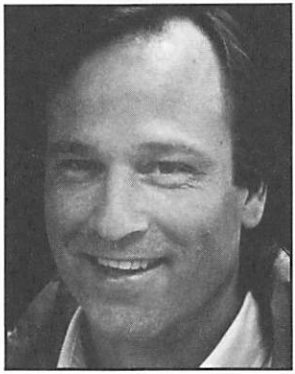
The pale disk of sun,
like yellowed ivory,
frames the old woman.
She bends, a hillock
on the flat tundra.
Purple stained fingers
skim the low branches.
Dusky blueberries
roll away like clouds.

Patrice Parker's poem was written for English 352, "Undergraduate Writers' Workshop: Poetry," Thomas Sexton, Professor, UAA English Department.

AN ECONOMIC CRITIQUE OF ALASKAN RESOURCE DISPOSITION

Liesl Schernthanner
Nicholas Ronan
Debra Pearson

Liesl Schernthanner



Nicholas Ronan

Debra Pearson

INTRODUCTION

Alaska is generously endowed with nature's gifts. Wildlife, timber, minerals, and oil and gas abound in this beautiful state. Under the Statehood Act, the State will eventually own the timber, oil and gas, and mineral resources on 104 million acres of land. In addition, the State has responsibility for managing fishery resources in state waters (within three miles of Alaska's coast).

With this generous endowment comes the responsibility of managing these resources. Part of management is the disposition of resources to private firms or individuals who harvest or mine the resources and bring them to market.

This paper presents an economic critique of the way the State of Alaska disposes of its resources. The paper first reviews the principles of resource disposition advocated by mainstream economists. These principles are based on the premise that the goal of resource management and disposition is economic efficiency.

The paper then evaluates the disposition of Alaska's oil, mineral, timber and fishery resources in terms of these economic principles. The paper concludes that many of Alaska's resources are inefficiently managed according to principles of resource economics.

Liesl Schernthanner, Nicholas Ronan and Debra Pearson's paper was prepared for Economics 435, "Economics of Resources," Gunner Knapp, Professor, UAA School of Public Affairs.

ECONOMIC PRINCIPLES OF RESOURCE DISPOSITION

Economist Arlon Tussing has suggested nine principles of mainstream resource economics with regard to the disposition of natural resources.[1] These are:

(1) Sell or lease resource rights at market value, and above all, don't give them away.

(2) Sell or lease them competitively.

(3) Make rights freely combinable, divisible, and transferable.

(4) Public authorities should settle for being "price-takers."[2]

(5) Recognize all costs associated with resource disposition, development, and production.

(6) The resource disposition system should be capable of adapting smoothly to unforeseen changes in demand, costs, or technology.

(7) Non-producing interests in resource development should bear a major share of the commodity-market risk.

(8) If it ain't broke, don't fix it.

(9) Don't mess with the rules without a very good reason, but if you've got to mess with them, do it and get it over with, but don't KEEP messing around.

These principles are based on the premise that the goal in resource disposition is maximization of social welfare through maximization of economic rent.

Economic rent is defined as the difference between the market value of a resource and all costs associated with getting that resource to market. When the maximization of economic rent is the goal of the resource owner, society will receive the greatest benefit from the resource, and the resource will be produced in the most efficient manner. Society benefits because economic rent can be taxed away without affecting the supply of the resource, thus insuring the owner of the resource, the State, a share of the profits from the development of its property. And, if society chooses not to tax away the rent, it will benefit indirectly because a system that maximizes rent will not waste any of society's other valuable resources, such as labor or capital, in the production process.

The first four principles are based on the idea that competition will assure the generation of economic rent. When the rights are sold or leased in a competitive market, at market value, the owner of the resource will capture the economic rent generated by the resource. It follows that the buyer of the rights in the competitive market will be the producer that holds the highest expected return. This process ensures that the owner will be paid the highest price, and the resource will be produced at the lowest cost possible.

Tussing believes that making the rights freely combinable, divisible, and transferable will promote the generation of economic rent when the rights are resold on the competitive market. The most efficient producers will buy the rights to produce the resource, and part of the economic rent generated by the sale of the rights to the resource can be taxed away.

When public authorities settle for being price-takers, they allow the market and its competitive forces to establish the price that assures maximum value. Since there is no *a priori* reason to believe that the resource owner would set the right price, and over or under pricing dissipates rent, owners should be price-takers.

The fifth principle is the owner should recognize all costs of resource development including external costs. These costs are not borne by the producer of the product, but are borne by society. Environmental damage is often cited as an example of external costs.

The sixth and seventh principles are concerned with risk sharing and adaptation to changes in the market for the commodity the resource provides. The State should share some of the risk to ensure the generation of economic rent. When the State shares the risk, more development will take place at the margin.[3] The same argument is true if the management system can adapt to changes in the market. This allows producers to continue to produce, and the State to continue to collect the economic rent generated by the resource.

Tussing's last two principles are that resource disposition systems shall be as stable as possible. Profit is the motivation for most resource developers, and for the most part, they are involved in long-term projects that must compete in world markets. When resource management rules are changed or threaten to change, the long-term decision-making process is impaired, and economic rent is lost.

DISPOSITION OF ALASKA RESOURCES

The methods the State uses to dispose of its resources are as varied as the resources themselves. For each resource, the disposition system will be compared with Tussing's principles as presented, in ascending order from 1 to 9. Wherever possible, the principles will be combined for brevity.

OIL

Alaska's oil resource management is consistent with most of Tussing's principles. The Prudhoe Bay and Kuparuk oil fields are part of the State's oil reserves.

Alaska leases the rights to develop oil resources to the highest bidder. The leases are not transferable, but the owners can allow others to explore and develop on the lease. The market system, for the most part, has operated unhindered, and has allocated the resource efficiently, within the framework set by the State.

The most common method used by Alaska for oil and gas leasing involves bidding for the highest up-front cash bonus, along with an agreement to pay a fixed royalty share. Under competitive circumstances, bonus bids result in the seller receiving the present value of the expected economic rent generated by the resource. Buyers operate with a degree of uncertainty, yet in order to obtain the right to develop the resource, they are willing to pay the State all the economic rent they expect to receive.

Royalty bids decrease the uncertainty associated with bonus bidding, because large up-front payments are not required. The firm's royalty payment will depend on the quantity produced. A fixed percentage royalty can be nonprofitable if it exceeds the expected rent from developing the resource. The higher the royalty rate, the lower the expected cash flow, and thus fewer discoveries can be economically developed.

The State requires that the minimum lease bid exceed a value estimated through geologic and economic factors. This establishes a price floor, below which the resource cannot be economically extracted.

Much effort is made to prevent the negative externalities caused by pollution from the exploration and development of oil and gas deposits. For example, environmental impact studies held up construction of the pipeline for a number of years. These studies attempted to determine the effect of building and operating the pipeline and production facilities on the wildlife and ecosystems.

A considerable external cost associated with the production of oil is related to the incident, report, and clean up of a spill, no matter how small. Also, drilling fluids cannot be dumped into the ocean unless they meet standards designed to prevent environmental degradation.

The State has adapted to some changes concerning demand, cost and technology, but not all. Royalty rates are tied to revenue produced, and not the company's net income. Since oil prices have fallen in the last few years, the minimum bid requirement has been lowered from $150 per acre to $25 per acre.[4]

The State bears part of the risk by offering royalty bids, and having regular sales conducive to bidding during several phases of the business cycle. The fixed royalty rate is connected to commodity prices. When oil prices are low, the State makes less money than when prices are higher.

For the most part, bonus bidding is low risk for the State. Alaska receives the money even if it turns out there is no oil. On the other hand, if it turns out there is no oil the State may not receive as much economic rent as it might have received under a royalty bid.

Within the last 25 years, regulators of the oil industry have done a fair job of not fixing what isn't broken, but they are presently messing with the rules. For example, recent debate over changing the Economic Limit Factor may have been a destabilizing influence on long-term planning.

Because oil revenues flowing into State coffers account for well over 85% of Alaska's total income, the Alaskan government finds itself concerned with more than simply the royalties from a resource under its control. The economic health of the State is of utmost importance. The oil industry affects everyone who lives in the State. This is why the State has proposed variations to the ways it accrues royalties and tax revenue from the oil firms. For as much as has been considered, little has actually transpired in the way of significantly altering the regulation. However, the fear of change may be enough to deter further resource development.

MINERALS

The days of the gold rush seem not so far away when one looks at Alaska's mineral resource policy today. Except for coal, which is managed by a lease system, mineral-right allocation is done by filing claims. This management scheme makes for inefficiency and loss of economic rent. Alaska mining is regulated by the Federal Mining Acts and the Alaska State Legislature. Under the claim system, there is no bidding or competition to attain mineral rights. The miner simply has to pay a location fee, mark the plot in a proper fashion, do a minimum of $100 "claim betterment" each year, and pay federal income taxes on any revenues earned. The free appropriation, not including

the cost of labor and equipment, is virtually a first come, first serve type market without the governing forces of competition.

Competitive bidding for coal leases ensures that the highest willingness to pay will come from the miner who thinks he can derive the greatest benefit. In this way, economic rent can be maximized.

Once in the possession of a miner, mineral rights can be sold or leased to anyone who has the willingness to pay for those rights. This generates economic rent and allows more efficient miners to enter the industry.

Mineral resources are not sold, so there is no price-taking, but the leasing method for coal redeems the system somewhat. In the past, the State has held competitive bids for 10,240 acre parcels, and the royalties on the extracted coal are based upon its content and quality. This is similar to a price-taking system, but the State sets a secret minimum bid level, revealed only after the bidding process, so it will, in effect, be price-makers in some instances.

Alaska's mineral resource policy makers often fail to recognize all costs associated with the disposition, development, and production of the resource. For example, state-built roads to privately operated mines are not uncommon in Alaska, and low acquisition payments and fixed royalty fees may not cover the costs of such a road. These costs include public costs such as pollution or loss of a recreation area, environmental costs, administrative costs, and construction costs. The Mining License Tax, a tax on net income from operation and lease royalties, is not sufficient to cover these costs either.

The lack of access to mines is a constant problem to those who wish to develop the resource. Though it can be seen that negative rent exists when the State provides transportation and infrastructure, programs were initiated to aid mineral development within the interior corridors of Alaska. For efficiency's sake, if costs had to be borne by the miners, those who get the benefits, some mines would not have been developed.

The long-term lease arrangement for coal rights in Alaska has fixed royalty rates. This does not allow for smooth adaptation to unforseen changes in demand, costs, or technology. If there were such a change, miners could be left with little or no profit and great liabilities, and the State could lose revenue. Unpredictable conditions and fixed royalty rates also make miners more conservative in their bids, resulting in a direct loss to the State.

For minerals other than coal, the mining industry has reacted to changes in the market by closing or opening mines. This type of adjustment is rarely smooth. It can have secondary effects on the workers, environment, and market place.

It is apparent that the system has flaws, but it works, and changing it could result in unforseen problems. This is a contributing factor to Alaska not significantly changing the claim system since the beginning of mineral exploitation in the region.

By "messing with the rules," and imposing the leasing system for coal rights, public authorities acted in accordance to Tussing's ninth principle, however, the second half of this principle, "don't keep messing around," cannot be applied to the disposition system. Frequent proposals and numerous actual adjustments in prices, taxes, and subsidies make coal miners raise their discount rate, concentrate their energies in a shorter time horizon, and lower their bids for development rights. New environmental regulations are also causing changes in the mining industry. These changes make miners less likely to risk investment, and in the extreme case, cause the abandonment of mines

altogether. This constant uncertainty about regulation is making miners less productive, thus there is a loss in revenue for the government, and less social benefit.

TIMBER

Both the federal government and the State of Alaska are major timber owners. The federal government manages the Tongass and Chugach National Forests, and the State owns approximately half of the forest land in Alaska's interior and a portion of the coastal forests.

The federal government and the State of Alaska both require all timber harvested from their lands to have primary manufacture. Primary manufacture requires that timber be cut into lumber, rough cut, or made into pulp before being exported. The State allows one exception to this rule, the exportation of wood chips.

Both the state and federal governments lease timber at competitive rates; however, restrictions by state and federal management make this rate very low.

The state and federal timber management systems are price-takers, even though they set primary processing restrictions upon the industry. These restrictions may lower bids by increasing production costs, but the trade-off is high Alaskan employment.

Management of this resource is flexible. State leases are long-term but can allow for changes in price and quantity of timber cut.

In contrast to the state and federal systems, Native groups which own timber resources are capturing higher economic rent. They are managing the resource in a more efficient manner; whereas, the state and federal government policies dissipate some of the economic rent in higher production costs.

FISHERIES

Because of its complexity, our discussion of the disposition of Alaska's fishery resources is divided into three representative species: crab, halibut, and salmon.

Crab

In 1959, The Alaska Board of Fisheries took over the management of Alaska crab fisheries from the federal government. The crab fisheries are managed on a seasonal catch quota basis by fishing region. These quotas are adjusted annually to reflect allowable harvest levels relative to stock size. The fisheries are open, thus harvesting and processing capacities are greater than the quota levels, requiring the seasons to be short and intensively competitive. This management routine violates all of the principles presented.

The quotas are neither sold nor auctioned off, and though the State technically owns the crab fisheries, the State does not capture *any* of the economic rent that could be generated in a competitive system of resource allocation.

There are a number of restrictions on crab fishermen and their vessels that do not allow the combination, division, or transfer of fishing rights. Vessels must comply with registration restrictions and are confined to certain fishing areas.[5] This type of arrangement tends to spread out fishing effort in "exclusive" and "superexclusive" areas and protect local fleets. Such protection may help avoid adverse socioeconomic impacts but is in conflict with optimizing economic return.[6]

Public authorities do not even approximate price-takers in this system of free quotas because there is no bidding, no taxation, and no royalty fees attached to the quotas.

The high prices associated with restricted crab supply do not create revenue that is returned to the owner of the fishery.

The costs associated with a catch-based quota system are numerous and lead to many inefficiencies affecting both the producer and consumer of crab. Much of the cost of the expensive management and enforcement is paid by the public via federal taxation. Fishermen pay the cost of re-tooling their operations, increasing manpower, and investing in crab-catching technology. Processors are faced with erratic supplies of crab from the quota-controlled fishery. In turn, consumers have to pay a high price for the commodity.

Carefully monitored stock levels determine the quotas on crab. This leaves no room for adjusting to changes in market demand, cost, or technology, and contributes to price fluctuations. The resource owners, however, do not bear any of this risk because they did not sell or lease any fishing rights. The financiers, fishermen, and managers of the fleets and processing industry endure the risk alone.

New regulations and restrictions concerning quotas, gear, vessels, and processing policies tend to be layered on old as authorities attempt to mitigate the peaks and valleys of the resource cycle. Fishermen, processors, and consumers adjust, but at the expense of efficiency. In the end, there is no economic rent.

Halibut

Alaskan halibut resources are jointly managed by the State of Alaska and the International Pacific Halibut Commission (IPHC). From an economic viewpoint, the management of the halibut fisheries is similar to crab. The right to fish for halibut is given away, which dissipates economic rent through the violation of Tussing's first four principles related to competition, as well as those associated with cost and risk.

Management attempts to maintain a maximum sustained yield (MSY), that is, catching the greatest annual amount of fish that can be maintained forever. This is presently done by employing an open-entry quota system. The quota sets a maximum harvest level, and allows fishing until this quantity is achieved. Formerly, seasonal dates were set, independent of the amount harvested, but this did not ensure MSY, and the system was changed in 1980.

There are no established property rights to be sold or otherwise allocated, thus anyone who can afford the price of a license and equipment can join the industry. Economic rent is frittered away as more and more fishermen enter the fishery, search out technology, and invest in new equipment to capture a fixed supply of halibut. Policy enforcement also dissipates economic rent.

Alaska and the IPHC do not recognize all of the costs of this management scheme on fishermen and society. The MSY system makes fishermen use more labor and equipment than necessary. It encourages abnormal physical risk as the seasons are shortened and supply of fishermen increase. Gear restrictions increase the costs to fishermen and society because the most efficient ways of catching halibut cannot be used.

In some instances, the system has made smooth adjustments to changes in market demand, costs, and technology. For example, halibut fishermen in the past have had to fish on days they probably would not have if the regulation were not in effect. This can cost more than just money for storm damages, as some fishermen have paid with their lives. In regard to this, IPHC can easily change quotas, regulatory area boundaries, and has recently tried to suspend fishing when the weather is too rough.

These regulators have acted with a minimum of delay and uncertainty when they changed size limits, imposed gear restrictions, and switched the seasonal system to a quota system. The exception to this principle adherence occurred from 1982-1985 when limited entry was discussed but not implemented. Their failure to act quickly and decisively led to a rapid increase in the number of halibut fishermen expecting to gain from the disposition of property rights to the halibut fishery. This boosted costs to fishermen and society.

Salmon

Management of the Alaskan salmon resource is different than that of crab or halibut. Entry into the salmon industry is limited, allowing the generation of economic rent. However, even though economic rent exists, social welfare is still not maximized because the original owner of the fishing right reaps the benefits and not society. This system still violates most of Tussing's principles, admittedly some worse than others.

The limited entry system did establish resource rights. However, these permits to fish were given away to historical users, rather than sold or competitively leased. Alaska does not have a method of taxation to capture any of the economic rent that the fishermen generate and keep.

The permits are treated like private property rights in that they can be sold, traded, or given away, but there are a number of restrictions attached to ownership. Only one permit per person is allowed, and the permit holder must fish on board the vessel. There is no access to the pure investor. Permits cannot be encumbered in any way except to the State as collateral on a loan, and they can be revoked.

This resource disposition system, like that of the other fisheries, does not include all of the external cost of production, thus social inefficiencies may exist. A significant limiting factor of this system is the plausibility of habitat degradation and consequent reduction in viable population of the resource. The fishermen do not pay for this or the cost of administration and enforcement.

The industry lacks adequate research and data bases to assess supply and demand and cannot adjust to sudden changes in these market factors. In addition, as with the other fishing systems, there is no mechanism built into limited entry for making non-producing interests bear some of the commodity-market risk.

Various agency-represented users are constantly vying for profitable fishing grounds, and frequent regulatory changes often reflect the jockeying for position of power within the industry. In short, they keep messing with the rules, but the system isn't fixed yet.

CONCLUSION

Alaska's present system for disposing of its resources follows Tussing's principles closely for some resources, such as oil, coal, and sometimes timber. For other resources, namely fisheries and hardrock minerals, the State's disposition system violates most of these principles, and economic rent is either completely dissipated or captured by others than the public owners.

Article VIII of the Alaska Constitution provides an insight into the disposition systems the State uses. The first four sections of Article VIII are as follows:

(1) It is the policy of the State to encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest.

(2) The legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people.

(3) Wherever occurring in their natural state; fish, wildlife, and waters are reserved to the people for common use.

(4) Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.

The goals of the these sections are not necessarily consistent with one another, nor are they consistent with Tussing's principles. Maximum use is not necessarily consistent with maximum benefit, and maximum benefit is not necessarily consistent with common use. The crab and halibut fisheries are perfect examples of these inconsistencies, because common and maximum use dissipate all rents and lower society's overall benefit. Therefore, Alaska's Constitution violates the economic principles of resource disposition because of these inconsistencies.

When these economic principles are adhered to, Alaskans benefit directly, as is visible when Alaskans receive their Permanent Fund dividend checks. Tussing recognized that there can be inconsistencies in these principles. He says, "None of these principles is an absolute; some of them may occasionally conflict with other legitimate principles of public policy; they sometimes conflict with one another; and in many cases it is not always obvious how best to translate them into practice."[7] Although following all of Tussing's principles may indeed be impossible, a system that relies heavily on competition and not giving resource rights away could provide even greater benefits to Alaskans from their public resources.

ENDNOTES

[1]Arlon Tussing, "An Economic Overview of Resource Disposition Systems." Tussing is a former professor of economics at the Institute of Social and Economic Research of the University of Alaska Anchorage. He presently heads a major firm consulting on resource economics.

[2]It is virtually impossible for a seller to set both price and volume without a surplus or shortage of the good being produced. Thus the seller should take the price determined by the forces of supply and demand in the market.

[3]For example, the State may wish to reduce its royalty share if resource prices fall. This means that it gets a smaller "piece of the pie," but this is better than not having any pie at all.

[4]Off shore, the federal government oil lease terms have been extended from five to ten years because of the difficulty in evaluating prospects in the Arctic. Leases have been granted in areas where current technology should be ready if a discovery is made.

[5]Currently areas are designated as superexclusive, exclusive or non-exclusive. A vessel registered in a superexclusive area may not fish in any other management area during the same year. A vessel registered in a non-exclusive area may fish in one exclusive area and any other non-exclusive area.

[6]P. L. Katz and L. J. Bledsoe, "Alaskan Shellfish Regulations: Present Impacts on Fishery Participant," American Fishermen's Society, 106 (1977): 505-29.

[7]Arlon Tussing, "An Economic Overview of Resource Disposition Systems," presented for the Conference on the Public Disposition of Natural Resources, sponsored by the Canadian Institute of Resources Law. Banff: April 13, 1983.

SOURCES

A broad collection of information common to the shelves of resource economists was used in compiling this paper. Below is a list of major sources used that include additional information for the interested reader.

Darr, David, Ronald Glass, Thomas Elli, and Donald Schmiege. An Overview of Some Economic Options for Southeast Alaskan Timber. Working Draft: 1977.

International Pacific Halibut Commission. Annual Report 1979-86. Seattle, Washington: 1979-86.

Johnson, Terry L. Alaska's Fisheries Handbook. Sitka: Diversified Information Services, 1986.

Katz, P. L. and L. J. Bledsoe. "Alaskan Shellfish Regulations: Present Impacts on Fishery Participant." American Fishermen's Society 106 (1977): 505-29.

Melteff, Brenda R., ed. Alaska Fisheries: 200 Years and 200 Miles of Change. Proc. of the 29th Alaska Science Conference. Sea Grant Report 79-6, August 1979.

Tussing, Arlon R. "Alaska's Petroleum-Based Economy." Alaska Resources Development: Issues of the 1980's. (Boulder, Co.: Westview Press, 1984), 51-78.

Tussing, Arlon R. An Economic Overview of Resource Disposition Systems. Presented for the Conference on the Public Disposition of Natural Resources, sponsored by the Canadian Institute of Resources Law. Banff: April 13, 1983.

Tussing, Arlon R. and Gregg K. Erickson. Mining and Public Policy in Alaska. University of Alaska: 1969.

United States Forest Service. Status of the Tongass National Forest, Southeast Alaska Conservation Council. Juneau: 1986.

POINTS OF ICE

Mary Ellen Havens

Throwing a large chunk of dry wood on top of the crackling kindling, Lizzie banged the stove lid into place and began slicing bacon into a cold iron skillet. She gripped the butcher knife with her gnarled hand, slicing the fatty meat evenly, without paying much attention to what she was doing.

She was wondering impatiently what was taking the old man so long at the morning barn chores, why he didn't have the water bucket back from the well so she could start the coffee. Muttering under her breath, she shoved the pan onto the stove and went to peer out the frost-covered window above the dry sink. She had to scratch a small hole in the frost with her short, blunt fingernail before she could see anything outside.

At first there was only a silent, white, unmoving world beyond the back porch; then she saw Bert's bundled up figure trudging slowly from the barn toward the back gate, a steaming bucket of morning milk swinging from each arm. His breath came in little white puffs, and she wondered in disgust why he didn't pull the woolen muffler up over his mouth and nose. "Damn fool!" she muttered. "He'll go and catch pneumonia and I'll have to take care of him on top of everything else. Damn old fool."

She heard him rattling around with the milk pails in the wash house lean-to, and knew that if she wanted water for coffee she'd probably have to get it herself. It took the old man longer and longer to get the barn work done mornings, and there didn't seem to be any other way about it.

The back door opened and let in a whirl of cold along with the old man. Without turning from the stove, Lizzie said mechanically, in a voice little warmer than the outside air, "Use that broom on those boots before you come dragging snow and dung in here on them." She slapped the eggs over viciously in the pan, listening to the kitchen door latch click behind Bert, and knew it was always the same, and always would be the same. At that moment she hated this miserable farm and that old man in the wash house almost more than she could bear. The feeling of it burned inside her and heated her whole body with its intensity.

The clock on the corner wall shelf chimed once. Glancing at it, Lizzie wiped her greasy hands on her apron and called up through the ceiling grate directly over the stove. "Irene, you almost ready? It's nearly seven thirty."

"I'll be down in a minute, Mama."

Lizzie had the fried eggs, side bacon, and hot biscuits on the table just in time for Irene to slip into her chair and begin eating. The third seat remained empty, and after a few minutes Irene looked anxiously at Lizzie. "Where's Papa?"

"He must have gone back out to hitch up the horse," Lizzie said. She sat down across from Irene and began to butter a biscuit. "He finished milking just before you came down—I'll fix him something he can eat on the way." She sandwiched one of the fried eggs and a couple slices of bacon between the halves of biscuit and wrapped it in one of the linen napkins.

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Irene chewed slowly, her neatly penciled brown eyebrows drawn into a slight frown directed at her plate of food. "Mama," she began. She took a deep breath, set her fork on the plate, and clasped her hands tightly together between the soft folds of her wool skirt. "Mama, I really think it would be a good idea for me to move into town." Lizzie's dry lips parted in a wordless protest as Irene looked up and added quickly, "maybe just for the week—I could come home on the weekends."

Lizzie looked at her daughter's bright eager eyes and smooth skin glowing in the warm light from the kerosene lamp. With a blunt index finger she crushed a few stray biscuit crumbs against the shiny oilcloth, scratching back and forth with the edge of her short fingernail. She felt a cold hand close around her heart, a sensation of fear and emptiness, as tangible as a lead weight, settle low inside her at the thought of her life without Irene's presence. But her face showed none of these things.

Irene sat at the table, wadding her linen napkin into a ball between her nervous, slender fingers, and continued in a reasonable voice. "It would be so much more convenient.... It's just getting to be too much for Papa, taking me to Dover to meet the street cars almost every morning—especially in this kind of weather." The younger woman glanced around the farmhouse kitchen, her eyes skimming over the far corner where the ice-glazed window panes stared back like the vacant eyes of some dead creature; an involuntary shiver seemed to pass through her, though Lizzie always made sure to set Irene's place closest to the big black cookstove that took up one whole end of the large kitchen.

Lizzie pulled her stout frame up from the chair and walked to the counter, keeping her back to Irene. She began scraping bacon grease from the iron pan onto an old tin plate. Woodenly, she said, "I told you before...it's not right for a girl to live alone in town. Good girls don't do that." It was delivered as a pronouncement, absolute and sure and inflexible.

"There's a nice boarding house on Madison Avenue, Mama...several teachers from my school live there." Irene watched Lizzie closely for any sign of mollification. She continued in a conciliatory tone, "I went and talked to the lady who runs it. She used to teach English at Central High School." She knew Lizzie's high regard for the school teaching profession.

"On Madison Avenue near the school?" Lizzie asked, giving nothing.

"No. Farther out toward Maple Hills. But Florence Gage, one of the teachers who stays there, said the street cars run almost to the next block, and I'd only have to change once."

"Out near the factory then." Lizzie's back stiffened and she said suspiciously, "Does she keep factory workers?"

If Lizzie had turned at that moment, she would have seen the color rise to Irene's cheeks like summer roses, but it was not her habit to be direct. Still going through the motions of cleaning the old skillet, she faced the counter and waited for an answer.

"I...I'm not sure...There might be a few staying there. But she's a nice lady, Mama, and she wouldn't let anybody..."

"There's all kinds of drifters and trash around," Lizzie cut in, "and you can't always tell just looking at them."

"Mama,..."

"I won't have you staying in some place like that. I didn't work and slave to raise you right and send you to the state college just so you could mix with a bunch of drifters

and who knows what else. We won't talk about it again. You belong here at home." Lizzie grasped desperately for control, felt it slipping gradually away.

"Mama, please listen. . ."

"I don't want to hear any more about it!" Lizzie clutched the handle of the iron skillet until her hand ached, waiting for Irene to gather her things together and leave the kitchen. She heard the chair scrape back from the table, then small shufflings as Irene bundled herself in her heavy coat and scarves, and picked up the leather valise which held her school books and papers.

Before she opened the back door, Irene spoke softly to Lizzie's unyielding back. "I wish you'd listen to me, Mama."

Something almost broke inside her, but she held it back, keeping her voice cool, once more giving nothing. "Don't forget the old man's breakfast," Lizzie said, without turning.

From the kitchen window she watched Bert help the girl into the sleigh, and felt a stinging behind her eyes as he tucked the old quilts in around her. Fighting it back with a deep breath, she thought despairingly, "just like that. . .just like that the whole world can turn upside down on you."

The bottomless pride she felt in Irene had made it all worthwhile—all the endless, backbreaking work a farmer's wife had to do, all the years raising the boys—both gone now, one dead of the typhoid, the other moved away to the city—until Irene had been born. Finally, her baby, her sweet girl. She can't go, Lizzie thought fiercely. She can't!

She knew what would happen to Irene if she got out into the world. It was a wicked place, Lizzie had found that out soon enough, a wicked, dreary place for a girl to grow up. There was always some man waiting to take advantage of an innocent girl, a girl like she had been, all those years ago when she had met Bert. Oh, they'd both been young then, and he'd been full of the devil and sweet words, with his deep-set brown eyes and his roving hands that had made her insides melt into warm molasses. She'd had no defense against those feelings, no desire to stop him. She knew what could happen to a young girl when such a man took her walking by the creek in the moonlight, and kissed her in the concealing shadows of the willow trees, pressing his hard body against hers on the soft, dewy summer grass. She knew all about such things, and where they led.

The shame of it had come afterward, when her father had demanded to know what man she'd let have his way with her, while her mother silently stared at her in disgust. They'd been determined to see him do the right thing by her, though the strain of that first baby, coming too soon after the wedding, had never quite been cleansed away, not in her own heart. She knew it was the punishment for her own weakness. But she wouldn't let it happen to Irene.

Another baby came soon after. That had been Rose, the girl she'd wanted, the one who had died of the whooping cough before her first summer passed. Lizzie remembered the soft chubby cheeks, red and burning with fever, and how she had sponged the baby's tiny face with cool well water, and rocked her to soothe the hoarse cries, after the women told her there was no longer any need. After all these years, she could still picture Rose's fuzzy blonde hair and brown eyes framed in thick soft lashes. Then, soon after they'd laid her in the ground, there was another baby boy to care for.

She had cared for them, and fed them, and done the farm chores, and fed the threshers and farm hands when they came. Her life had settled into a dull, steady cycle

of work. After that third baby, her tired body still healing and protesting painfully, she'd be damned if she'd give Bert the satisfaction of his rough fumbling pleasure, with the endless prospect of more babies and more work. She had moved him into the front bedroom, and the house had taken on a chill neutrality, a chronic displeasure, as though unfriendly strangers were trying to live together there.

She'd always been strong—her father had called her willful and obstinate. Bitterly she wondered why she hadn't been strong that day so long ago when Bert had led her under the willows. Only once had she weakened after she moved Bert out of their bedroom, years later, when the boys were almost grown. It was after her cousin Mabel's wedding, when they had come home late, tired and softened by the day's festivities. Irene had come from that, but Bert had never tried again. She'd never weakened or given him any sign of encouragement after that.

Lizzie's breath had melted a hand-sized opening in the feathery-patterned frost on the kitchen window. The sleigh had long since disappeared behind the drifts and on down the lane toward the main road. She tried to put the argument with Irene out of her mind, reassuring herself that there was no real chance of the girl moving to town. It just couldn't happen, she wouldn't let it, because then...then the last bit of color and warmth in her life would be gone. The thought brought a dull ache to her temples, and she swallowed convulsively to get rid of the lump that had suddenly risen in her throat.

It took about two hours to make the round trip to Dover in the sleigh, sometimes longer. The old man wouldn't be back until ten o'clock at the earliest. Lizzie put on her heavy grey woolen sweater and went out to the wash house, where she pumped bucket after bucket of cistern water and lugged it across the room to fill the two black iron kettles over the fireplace. Her breath showed in the cold air, but the room would warm up some after she lit the fire under the kettles. When the kindling had caught, she put bigger logs in and pulled the galvanized washtubs off the wall where they hung, setting them on the wooden wash tables. Then she went back into the main house to gather laundry while the water heated.

She stripped the muslin sheets off the old man's bed, then her own in the large side bedroom. Irene's room, right over the kitchen, was pleasantly warm from the radiant heat of the stovepipe and the floor grate over the kitchen cookstove. It was the only warm room in the old house, besides the kitchen. Lizzie looked around at the little touches Irene had added to make the bleak farmhouse bedroom more comfortable, pictures on the walls, and brightly embroidered pillows scattered across the bed. Against one wall there was a maple bookshelf and desk that the old man had built for her after she came back from the State Teachers College in Shippensburg. Lizzie brushed her rough fingertips along the backs of the books she wished she could read as well as Irene did.

Maybe she hadn't done so well, she admitted, kept from all the things she'd dreamed of by the girlhood weakness and a man's insistence, but she certainly hadn't let that happen to Irene. She thought proudly of the girl's graduation at the head of her college class, of the offers from several schools for teaching jobs. Lizzie had wanted her to take one of the small country schools closer to home, but Irene had wanted so badly to teach in the city, to be near the public library, that Lizzie had reluctantly let her go there. Now she was wondering about the wisdom of that decision.

A cold morning light was shining weakly through the white-curtained window, by which Lizzie studied her reflection in the mirror that hung on the wall above the

dresser. Once she'd been small and slender, with wavy light brown hair and eyes that twinkled when she smiled, much as Irene looked now. The old woman in the mirror had greyish-yellow hair pinned tightly back into a knot, a few stringy wisps framing her heavy jowled face, and a hard look about her eyes. Lizzie tentatively moved her lips into the form of a smile, but the motion felt stiffly foreign and unnatural; it looked more like a grimace. With her work-hardened fingers she touched her cheeks, searching for the delicate bones beneath the heaviness. "Such foolishness, such foolishness," she chided herself. "You have Irene and that's enough."

When the old man was gone it would just be the two of them. She envisioned Irene correcting papers at the kitchen table in the evening, after the supper dishes had been cleared away. Lizzie would like to move her rocking chair closer to the big table so that she could work on braiding rag rugs, or knitting, and still look up now and then to enjoy seeing Irene's pretty young face in the lamplight.

Lizzie sighed, bending to pick up the white flannel nightgown that had slipped from the tall bedpost. While grasping at the dresser for support, she touched something that was barely sticking out from under the back edge of the crocheted bureau scarf. It was a wrinkled piece of green and white paper. She pulled it out, smoothing it with her fingertips into a small square. It was a paper napkin, a brown circular stain ruffling one corner. There was a green bird pictured in the center, with fancy green script underneath that read "The Green Parrot Bar and Grill." She held it between her fingers like she might hold a dead mouse by its tail, as though a bad smell emanated from it, then let it fall back on the dresser by the row of cologne bottles.

The old man returned while Lizzie was hanging the wet laundry on rope lines strung across the wash house. They passed the remainder of that day in their customary cold silence, moving from one piece of necessary work to the next. About four o'clock in the afternoon Lizzie looked up from her ironing and gave an involuntary exclamation of surprise when she saw a motor car driving cautiously up the ice-glazed lane. No one ever came to visit on weekday afternoons, and rarely at all. The old man had just gone out to hitch up the horse, because he always left to pick Irene up in Dover at four thirty.

She watched from the kitchen window as an unfamiliar man, wrapped against the cold in a bulky blue jacket and plaid wool cap, got out of the driver's seat and went around to open the door on the passenger's side. Her eyes narrowed in disbelief when a female figure wearing Irene's long black coat and white scarf took the man's extended hand and got out of the car. The man and woman stood close together, his head bent low over hers and her hand still in his as they talked. After a few minutes the old man, with a piece of harness slung over his shoulder, came out of the barn and joined them. Soon Irene left the two men and came through the back gate, down the snow-banked path toward the house.

Lizzie moved from the window and stood watching the back door, anticipating the moment when Irene would reach it. Something was happening, something about which she had no good feelings. She couldn't figure out exactly what it was, partly because her suspicions were too awful to think about. This left her with no way to prepare or stand up to it, and she didn't like that at all.

The door opened, and Irene slipped in with a rush of cold air. "Stamp that snow off your boots before you make a mess," Lizzie said from habit, watching Irene pull

the white scarf from around her head and hang it over the back of the wooden chair. Wisps of soft brown hair framed her pretty face, her cheeks bright from the cold, and made her look like a twelve-year-old schoolgirl in the waning light.

"I did, Mama," Irene said softly.

The two women stood silently looking at each other for what seemed to Lizzie to be several uncomfortable minutes. If Irene had something to say, she could say it, but Lizzie had no intention of pressing ahead and helping her. The girl had some explaining to do, that was certain. Lizzie thought of the green and white napkin on the dresser, and now, here she was coming home in a car with a strange man. There was probably some reasonable explanation for these things, but Lizzie was beginning to feel twisted and cold inside, and no longer certain of anything.

"Mama, I tried to talk to you," Irene began.

"I want to know who that man is," Lizzie blurted out in spite of her intentions. "I want to know what you're doing riding around in a motor car with some strange man." She didn't even mention the napkin and the touching, the hints of an intimacy she didn't want to acknowledge for fear it would become more than it really was. She felt her breath, shallow and rasping as sandpaper in her chest, as she faced Irene across the wide table.

"He's not a 'strange man', Mama. He's a good friend of mine. His name is Robert Kolivosky."

"And what's his business here?" Lizzie challenged. "What's he doing bringing you home in his motor car?"

Irene pulled her white mittens off and laid them carefully on top of the scarf. "I'm moving into town, to the boarding house, Mama. Robert is taking me there this afternoon." She hesitated, seeming to search for words that refused to come, then turned and headed for the stairs. Lizzie sought desperately for control—of herself, and the situation, but most of all, of Irene.

"Is *he* one of those teachers that lives there, Irene? Is that why you want to go?" Suddenly she remembered the napkin on Irene's dresser and she added in a cutting tone, "Any teacher who takes young girls to drinking places isn't fit for that profession."

Irene stopped as she reached the bottom step and Lizzie knew she had reached her. "He's not a teacher, Mama," Irene said softly, without turning.

"What did you say?"

Irene turned around slowly and Lizzie was dismayed at the unaccustomed look of determination on her face. "I said, he's not a teacher."

An image of the man outside, in his heavy blue coat and plaid cap, working man's clothes, rose before Lizzie's eyes; she stared in disbelief at Irene. "He works at the factory! He's one of those foreigners that works at the factory, isn't he? Don't you deny it, girl. I can tell from the guilt written all over your face that it's true."

"I wasn't going to deny it, Mama." Irene answered calmly, much more composed than Lizzie felt, and this upset the older woman even more. "Yes, Robert works at the factory. He's one of the division supervisors, and he's a very nice person, but that doesn't make any difference to you, does it, Mama?"

Without waiting for a reply Irene turned and went up the stairs. Lizzie heard her moving about her room, over the kitchen, opening and closing drawers. She felt a cold fury rising in her, an unmitigated and all encompassing hatred directed toward the old man, and the foreigner standing by his motor car waiting for her daughter to

come out to him, and for all men; at the same time she felt a cord tightening, straining and becoming stretched to the breaking point, her tie to Irene thinning and disappearing. All the frustration of her life seethed to the surface, and she screeched through the ceiling grate at the girl moving above her, "Any girl who lets herself fall to that level is no better than a tramp! You went out to drinking places and let him paw you and probably even more than that! Didn't you? Didn't you?"

Lizzie clutched the back of a chair and stared at the ceiling. For a moment silence hung above her, then again the sound of movement and scraping of dresser drawers drifted down. Finally she heard Irene's footsteps on the stairway.

The young woman appeared with an old black suitcase in her hand, and her eyes wet with unshed tears and wounded feelings. "I'll be back later for the rest of my things," she said, hardly above a whisper. At the back door she hesitated, then turned to Lizzie. "I wanted it to be different, Mama. . . I didn't want to go like this. It could have been different."

Lizzie's mouth twitched as she fought back what she might have said. She couldn't weaken or give in, not now. The girl would soon come to her senses and be home, she was sure of it.

Irene looked away and quickly opened the door to leave. "Good-bye, Mama. . . I hope you can understand someday."

Lizzie turned to stare out the window; her heart felt as cold and stiff as the frosted iron fence posts Irene walked quickly past on her way to the waiting car. The tall man in the blue coat met her at the gate, taking the suitcase and touching her face with his gloved fingers. Then they got into his car and drove slowly out the lane, as the old man raised his hand in farewell, before turning toward the house in the growing cold of the winter night. The stars overhead glittered like points of ice on a barren endless emptiness.

FAT UTILIZATION ENHANCED BY ENDURANCE EXERCISE AND COLD EXPOSURE

Robin L. McClymonds

INTRODUCTION

Fat is a very efficient energy storage form containing more than twice the energy per unit weight of other foodstuffs. Fat utilization during endurance exercise depends primarily on the intensity and duration and one's level of physical fitness. However, the temperature of the environment can also affect the use of fat. Exposure to cold environments and participation in endurance exercise impose upon the body high energy needs that can efficiently be met through the utilization of fat as a fuel. Information regarding the contribution of fat to the energy requirement of exercise at cold environmental temperatures is sparse. Therefore, the purpose of this paper is to explore the effects of endurance exercise and cold exposure on fat utilization.

FATS AS FUEL

Mobilization of fats (energy) from adipose tissue, their transport to and uptake and utilization in muscle constitute a complicated and lengthy process. A basic understanding of fat metabolism is necessary to appreciate the effect exercise and cold exposure can have on the utilization of fat as a fuel. Fats can be catabolized by oxidative mechanisms only, thus energy transduction from fats is dependent on presence of oxygen. Triglyceride is the most common form of dietary fat and the major form of fat storage in the body. Since half or more of the fat combusted during prolonged exercise comes from adipose tissue,[1] triglycerides stored here must be broken down to fatty acids (lipolysis), released into the blood, circulated to active muscle, taken up and oxidized before they can be utilized as a form of energy.

Fat mobilization is the process of triglyceride fat being converted to Free Fatty Acids (FFA) and glycerol to be transported from adipose tissue to the working muscle. Once FFA are delivered to muscle cells they are activated before they gain entry into the mitochondria for oxidation. The translocation of activated fatty acids from cystol

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into mitochondria is a rate-limiting step in lipid metabolism. Once inside mitochondria, activated fatty acids are degraded through the beta-oxidation cycle forming acetyl-CoA which then enters the Krebs cycle. For every acetyl-CoA that enters the Krebs cycle, 12 moles of ATP are formed. As compared to 36 moles of ATP formed from 1 molecule of glucose (source of energy from carbohydrates), 1 molecule of fatty acid, for example 18-carbon stearic acid, yields 146 moles of ATP given sufficient amount of oxygen.[2] On a gram-weight basis, the combustion of fat produces more than twice (over 9 Kcal/g) the energy of carbohydrate and protein (about 4 Kcal/g).

FAT UTILIZATION AND ENDURANCE EXERCISE

The ability to use fat as a fuel during endurance exercise depends on the arterial blood level (mobilization) and muscle blood flow (circulation). It is well established that endurance exercise produces major cardiovascular adaptations in trained individuals which improve oxygen and blood delivery to working muscles.[3] Since fat mobilization and utilization are dependent on circulating level of FFA, rate of blood flow and presence of sufficient oxygen, an efficient cardiovascular system enhances one's endurance ability through prolonged provision of fuels and oxygen.[4]

In addition to cardiovascular changes, major biochemical adaptations occur in skeletal muscle in response to regularly performed endurance exercise. These biochemical adaptations increase the skeletal muscle's capacity for aerobic metabolism and thus the utilization of fatty acids.

Adaptations in Response to Exercise

Prolonged training causes an increase in the size and number of mitochondria as well as an increase in mitochondria enzymes.[5] Lipoprotein hormone-sensitive lipase, one particular enzyme enhanced as an effect of endurance training,[6] allows for greater use of triglyceride contained in circulating lipoproteins and intramuscular fat during exercise. Results from a study conducted by Kiessling and associates[7] confirmed mitochondrial changes do occur in human skeletal muscle after endurance exercise. Further evidence that exercise training stimulates mitochondrial growth and oxidative capacity has been provided by Morgan and associates.[8]

The advantage of increase in mitochondrial activity is an increased capacity for fatty acid oxidation, which would slow down glycolysis with decreased formation rate of lactate. Metabolic changes counteracting a rise in lactate favor an increased capacity for prolonged submaximal exercise.[9] Rennie and Holloszy[10] demonstrated the availability of fatty acids has an inhibitory effect on glucose uptake and glycogen utilization in well-oxygenated red skeletal muscle. The sparing of glycogen catabolism by utilizing fats during prolonged exercise in endurance-trained individuals counteracts a rise in lactate. The process of fat mobilization is inhibited by the accumulation of lactate.[11] The efficient cardiovascular system of endurance-trained individuals can allow for quicker lactate removal from muscles (removing inhibitory effect on fat mobilization) and better oxygen delivery to muscles (enhancing fat oxidation).

Fat Utilized During Exercise

The relative usage of fat depends upon the duration and intensity of exercise, the individual's level of conditioning, and the blood levels of FFA. Oxidation of fatty

acids provides a major portion of the energy for muscle metabolism during prolonged submaximal exercise.[12] There is increased activity in lipid metabolism caused by aerobic exercise.[13] As the intensity of the exercise increases, a progressively greater proportion of the needed energy is derived from glycogen. Hagenfeldt and Wahren[14] demonstrated fatty acid oxidation is only 60% at higher intensities of exercise whereas at low-work, submaximal intensity fatty oxidation is complete. One's level of physical fitness determines the amounts of glucose/glycogen and fat utilized at different work loads, with fatty acid oxidation serving as a more important source of energy in endurance-trained individuals.[15] A study conducted by Costill and associates[16] clearly demonstrated training for endurance exercise markedly enhances the muscle's capacity to metabolize fats.

Fatty acid oxidation during muscular work is positively related to the concentration of plasma FFA; that is, the higher the plasma levels the greater the use.[17] Both trained and untrained muscles demonstrate a marked increase in fatty acid oxidation when plasma FFA concentrations are elevated[18] muscle triglycerides, as opposed to plasma FFA, may also serve as a source of fatty acids for oxidation during exercise.[19] Factors that enhance FFA mobilization and oxidation help spare glycogen and can improve endurance performance.[20] Adrenergic stimulation (increased sympathetic nervous activity) appears to be responsible for release of FFA from stored triglycerides.[21] During emergency states, such as exposure to cold or when the "fight or flight" reaction (sympathetic activity) is triggered, triglyceride stores in adipose tissue are exported as FFA to muscles.[22]

Catecholamines as a Potent Lipolytic Agent

Catecholamines are constituents of the sympathetic nervous system. Blood levels of norepinephrine, a catecholamine, rise with prolonged physical activity; there is also a rise in concentration of FFA as exercise continues.[23] It has also been shown plasma FFA concentrations rise rapidly immediately following the cessation of exercise.[24] Catecholamines have been shown to stimulate fat mobilization,[25] and elevated plasma levels of catecholamines, i.e. norepinephrine, have been shown to exist during exercise.[26] Since catecholamines are potent lipolytic agents, Rosell and Ballard[27] suggest the sympathetic (adrenergic neurohumoral) system plays an important role in the mobilization of fat during exercise.

A physiological response to cold exposure is a rise in the circulating concentrations of catecholamines.[28] A study by Wagner, Horvath, Kitagawa and Bolduan,[29] demonstrated elevated levels of catecholamines in young and older men and women upon exposure to cold. The mobilization and metabolism of triglycerides needed for increased heat production during cold exposure is linked to the actions of catecholamines.[30] Francesconi points out that the magnitude of catecholamine response to exercise in the cold may be affected by the intensity and duration of the exercise, fitness level, the ambient temperature, and degree of acclimation.[31]

COLD ENVIRONMENTS AND FAT UTILIZATION

The topic of physiological responses to cold exposure implies a discussion of human thermoregulation which requires an understanding of the body's heat production (thermogenesis), of thermal exchange between the body and the environment, and of the regulatory mechanisms used by the body to control these processes.[32] An in-depth discussion of thermoregulation is beyond the scope of this paper but of interest is the role fats play in the body's production of heat in response to the cold.

Cold-Induced Thermogenesis

Cold-induced thermogenesis can be defined as an increase in metabolic rate that occurs in the body in response to cold exposure. Both non-shivering thermogenesis and shivering thermogenesis have the same effect of heat production; the site of thermogenesis in the latter is muscle whereas the former, non-shivering thermogenesis, is a phenomenon linked to metabolism of Brown Adipose Tissue (BAT). BAT function and structure, as well as its distribution, differ from that of "regular" adipose tissue. BAT is characterized by a very high mitochondrial content and a high concentration of oxidative enzymes. Sympathetic-nerve-medicated changes in resting metabolic rate occurring in relation to cold suggest that BAT has a role in energy metabolism in human beings.[33] A study carried out by Young and associates[34] to assess sympathetic activity in BAT in response to cold exposure supported the important role of the sympathetic nervous system in regulation of energy balance.

Cold is an external stimuli that triggers thermogenesis in BAT, this is regulated through the release of norepinephrine. This results in increased cyclic-AMP production which leads to accelerated lipolysis. FFA released from lipolysis serve as fuel for increased thermogenesis.[35] Hiroshige and colleagues[36] established the important role catecholamines, namely norepinephrine, have in activating thermoregulatory heat production in BAT. Non-shivering thermogenesis and the metabolism of BAT is closely inter-related to sympathetic nerve activity, and metabolic processes that affect the utilization of fats in cold environments[37] and can possibly hold valuable information for gaining more understanding of fat utilization during exercise in cold environments.

Shivering thermogenesis is a normal physiological response to cold in an attempt to maintain body core temperature at 37 degrees celsius. Upon cold exposure the body vasoconstricts peripheral vessels in an attempt to conserve heat. If body temperature falls despite vasoconstriction, metabolic heat production is increased through muscle activity known as shivering.[38]

Exercise is a powerful thermogenic stimulus and can increase metabolic rate 15 to 20 times above resting levels.[39] Moderately heavy exercise in cold environments produces heat sufficient enough to raise internal body temperature to a level at which shivering is no longer required.[40] Although shivering can coexist with exercise, an increase in exercise intensity has the effect of increasingly suppressing the shivering response.[41] In addition to generating heat through muscular activity, exercise training helps improve the efficiency of one's thermoregulatory system which enhances the ability to cope with cold environments.[42]

Adaptation and Metabolic Rate in Cold Environments

Although it is recognized there can be an "insulative" or "hypothermic" human adaptation to the cold, it is the "metabolic" pattern of adaptation to the cold that is of interest in regards to exercise and fat metabolism. Considering the enormous metabolic demands imposed by exercise in the cold, it is surprising there is not more current available literature on the physiological responses to exercise in cold environments.

Campbell[43] reviewed the nutritional and physiological aspects of the way man adapts his energy balance to life in polar regions. He concluded the effects of endurance exertion in the cold on energy, as evidenced through changes in body weight and composition, need further investigation. Golden and Tipton[44] assessed the effect of exercise on adaptation (reduced metabolic activity) to intermittent severe cold exposure. It was

concluded resting exposure as compared to performance of exercise during repeated exposure to cold, was the more effective way of producing an adaptation. But what about the effect of exercise on adaptation to prolonged exposure to cold? Physical conditioning seems to be beneficial in cold acclimatization (physiological compensation to environmental stress occurring over a period of time) just as it is in the heat at high altitude[45] but the exact relationship and physiological mechanism involved is unclear and needs further investigation.

Definite physical alterations occur through cold-adaptation or acclimatization that improve one's function in cold environments.[46] It has been demonstrated that cold-adapted individuals' physiological response to cold exposure differs considerably from normal physiological responses, of particular interest are the differences between plasma FFA concentrations. Cold-adapted persons generally have lower plasma FFA while non-adapted persons display considerably higher levels of plasma FFA upon exposure to the cold.[47] In response to cold, sympathetic nervous activity of an acclimated individual is greatly reduced, unlike non-adapted man on whom cold acts as a stimulant to increase sympathetic activity.[48] It is difficult to demonstrate true physiological adaptation in persons who are not chronically exposed to the cold. Western man adapts various tricks in the organization of shelter, clothing and outdoor movement to minimize cold exposure for extended periods of time. Thus it is understood the physiological mechanisms discussed are those belonging to non-adapted or unacclimatized individuals unless stated otherwise.

Exposure to even mild cold (for example, 22° C), increases one's metabolic rate at rest.[49] In an attempt to clarify the physiological significance of fat metabolism in human adaptation to the cold, Itoh and Kurshima[50] demonstrated individual's plasma FFA concentration increase significantly in response to cold exposure.

Stroud[51] attributed an increased Basal Metabolic Rate (BMR) to prolonged and strenuous exercise and cold exposure. Fat loss in the cold could be due to the direct stimulation of fat mobilization or the enhanced total caloric expenditure (increased BMR) induced by exercise and cold exposure.[52]

SUMMARY

Fat Utilization During Endurance Exercise in Cold Environments

A combination of cold exposure and prolonged vigorous activity leads to fat utilization greater than that encountered with equal activity under warm conditions. Added energy expenditure, and mobilization of fat to sustain body temperature are factors that contribute to fat utilization during endurance exercise in the cold. A study by Patton and Vogel[53] undertaken to assess the relative endurance performance (75-80% VO2 max) of subjects exposed to cold temperatures showed cold exposure does not alter one's aerobic capacity. Romet, Shepard, and Frim[54] demonstrated a significantly greater oxygen uptake during exercise in cold environments as compared to warm environments. It is known endurance-trained individuals are much more efficient at fat utilization during exercise; in addition Kaminsky and associates[55] discovered that during recovery phase (post-exercise period) individuals with higher aerobic capacities utilized more fat than individuals with lower aerobic capacities.

Timmons and associates[56] conducted a study to examine the relationship between endurance exercise, cold exposure, and fat utilization. Oxygen consumption during

exercise in minus 10°C averaged 10% higher. The rates of total energy use were significantly higher at cold temperatures than at warmer temperatures. The cumulative total energy expenditure for 60 minutes of exercise was 13% higher and the cumulative fat expenditure was 35% higher in the cold environment. The results of this study conclude that a cold environment can significantly increase fat utilization during endurance exercise.

CONCLUSION

Based on the above information it can be concluded:

1. Exercise in the cold demands more energy than performance of the same amount of work in a warm environment.

2. The increased energy demands of muscular work and heat production during exercise in cold environments can be met through the utilization of fats, an energy dense source of fuel.

3. Both cold exposure and exercise have been shown to stimulate fat catabolism and enhance metabolism.

4. The fitness of an individual plays an important role in the initiation and utilization of fats: endurance-trained persons have an increased ability to utilize fats during exercise in cold environments.

RECOMMENDATIONS

There is a need for more studies to assess physiological responses in humans to exercise during cold exposure, with special consideration given to fat utilization. When evaluating the metabolic responses to exercise in cold environments, it must be noted there are many interrelated variables that can prove to be difficult to control, i.e. nutritional condition, level of fitness, sympathetic nervous activity, acclimation level, perception and reality of stress, thermogenesis, intensity and duration of exercise, availability of oxygen and/or FFA, catecholamine levels, ambient temperature, etc. Given the available data, there is a definite connection between endurance exercise, cold exposure and fat utilization leading one to the conclusion that fat utilization is increased by endurance exercise in cold environments.

ENDNOTES

[1]G. A. Brooks and T. D. Fahey, Fundamentals of Human Performance (New York: Macmillan, 1987).

[2]R. J. Shepard, "Lipids." Chap. 4 in Biochemistry of Physical Activity, ed. E. G. Thomas (Springfield, Ill., 1984).

[3]W. L. Haskell, "Cardiovascular Benefits and Risks of Exercise: The Scientific Evidence." Sports Medicine (Philadelphia: W. B. Saunders, 1984): 55-75.

[4]L. Hagenfeldt and J. Wahren, "Turnover of FFA During Recovery from Exercise," J Appl Physiol 39 (1975): 247-250; Kaminsky, Knowlton, Perkins and Hetzler, "Relationships of Aerobic Capacity & Percent Body Fat with Plasma Free Fatty Acid Following Walking," American Journal Clinical Nutrition 44 (1986): 603-609.

[5]J. O. Holloszy, L. B. Oscai, P. A. Mole and I. J. Don, "Biochemical Adaptations to Endurance Exercise in Skeletal Muscle," Chapter in Muscle Metabolism During Exercise (New York: Plenum, 1971): 51-61.

[6]Brooks and Fahey, Ibid.

[7]K. H. Kiessling, K. Piehl and C. G. Lundquist, "Effect of Physical Training on Ultrastructural Features in Human Skeletal Muscle," Chapter in Muscle Metabolism During Exercise, eds. B. Pernow and B. Saltin (New York: Plenum, 1971): 153-163.

[8]T. E. Morgan, L. A. Cobb, F. A. Short & G. R. Gunn, "Effects of Long-Term Exercise on Human Muscle Mitochondria," B. Pernow and B. Saltin (Eds.), Chapter in Muscle Metabolism During Exercise (New York: Plenum 1971): 87-96.

[9]J. O. Holloszy, "Biochemical Adaptations in Muscle. Effects of Exercise on Mitochondrial Oxygen Uptake and Respiratory Enzyme Activity in Skeletal Muscle," J Biol Chem 242 (1969): 2278.

[10]M. J. Rennie and J. O. Holloszy, "Inhibition of Glucose Uptake and Glycogenolysis by Availability of Oleate in Well-oxygenated Perfused Skeletal Muscle," Biochemical J Vol. 168 (1977): 161-170.

[11]B. B. Fredholm, "Fat Mobilization and Blood Lactate Concentration," Chapter in Muscle Metabolism During Exercise (New York: Plenum, 1971): 249-255; Shepard, Ibid.

[12]R. J. Havel, B. Pernow and N. L. Jones, "Uptake and Release of FFA and other Metabolites in the Legs of Exercising Men," J Appl Physiol 23, no. 1 (1967): 90-99; Shepard, Ibid.

[13]J. Parizkova, "Body Composition and Lipid Metabolism in Relation to Nutrition and Exercise," Chapter in Nutrition, Physical Fitness, and Health, eds. J. Parizkova and V. A. Rogozkin (Baltimore: University Park, 1978): 61-75.

[14]L. Hagenfeldt and J. Wahren, "Metabolism of FFA and Ketone Bodies in Skeletal Muscle," Chapter in Muscle Metabolism During Exercise (New York: Plenum, 1971): 153-163.

[15]R. H. Johnson, J. L. Walton, H. A. Krebs, and R. H. Williamson, "Metabolic Fuels During and After Severe Exercise in Athletes and Non-athletes," Lancet 2 (1969): 452-455.

[16]D. L. Costill, W. J. Fink, L. H. Getchell, J. L. Ivy, and F. A. Witzmann, "Lipid Metabolism in Skeletal Muscle of Endurance-trained Males and Females," J Appl Physiol 47 (1979): 787-791.

[17]Havel, Pernow and Jones, 90-99.

[18]D. L. Costill, E. Coyle, G. Dalsky, W. Evans, W. Fink, and D. Hoopes, "Effects of Elevated Plasma FFA and Insulin on Muscle Glycogen Usage During Exercise," J Appl Physiol 47 (1977): 695-699.

[19]S. O. Froberg, L. A. Carlson and L. G. Ekelund, "Local Lipid Stores and Exercise," Chapter in Muscle Metabolism During Exercise (New York: Plenum, 1971): 307-313.

[20]J. H. Wilmore and B. J. Freund, "Nutritional Enhancement of Athletic Performance," Chapter in Nutrition and Exercise, ed. M. Winick, (New York: Wiley and Sons, 1986): 67-97.

[21]R. J. Havel, "Influence of Intensity and Duration of Exercise on Supply and Use of Fuels," Chapter in Muscle Metabolism During Exercise (New York: Plenum, 1971): 315-325.

[22]J. Himms-Hagen, "Thermogenesis in Brown Adipose Tissue an Energy Buffer; Implications for Obesity," In Seminars in Medicine of the Beth Israel Hospital, Boston, eds. J. S. Flier and L. H. Underhill, The New England J of Med 331, no. 24 (1984): 1549-1558.

[23]Shepard, Ibid.

[24]Hagenfeldt and Wahren, Turnover of FFA, 247-250.

[25]Havel, Influence of Intensity, 315-325.

[26]J. Haggendal, "Role of Circulating Noradrenaline and Adrenaline," Muscle Metabolism During Exercise (New York: Plenum 1971): 119-125.

[27]S. Rossell and K. Ballard, "Andreergic Neuro-humoral Control of Lipolysis in Adipose Tissue," Chapter in Muscle Metabolism During Exercise, eds. B. Pernow and B. Saltin (New York: Plenum, 1971): 1-117.

[28]E. L. Lloyd, Hypothermia and Cold Stress (London: Croom Helm, 1986): 77-157.

[29]J. A. Wagner, S. M. Horvath, K. Kitagawa and N. W. Bolduan, "Comparisons of Blood and Urinary Responses to Cold Exposures in Young and Older Men and Women," J Gerontology 42, no. 2 (1987): 173-179.

[30]J. E. Wilkerson, P. B. Raven, N. W. Bolduan and S. M. Horvath, "Adaptations in Man's Adrenal Function in Response to Cold Stress," J Appl Physiol 36 (1974): 183-189.

[31]R. P. Francesconi, "Endocrinological Responses to Exercise in Stressful Environments," Exercise Sport Sci Rev. 16:255-84.

[32]J. Frim, "Fundamentals of Thermoregulation." Chapter in Hypoxia and Cold, eds. J. R. Sutton, C. S. Houston and G. Cotes (New York: Praeger, 1987): 19-32.

[33]Himms and Hagen, 1549-1558.

[34]J. B. Young, E. Saville, J. J. Rothwell, M. J. Stock and L. Landsberg, "Effect of Diet and Cold Exposure on Norepinephrine Turnover in Brown Adipose Tissue of the Rat," J. Clinical Investigation 69 (1982): 1061-1071.

[35]Himms and Hagen, 1549-1558.

[36]T. Hiroshige, K. Yoshimura & S. Itoh, "Mechanisms Involved in Thermoregulatory Heat Production in Brown Adipose Tissue," S. Itoh, K. Ogata, & H. Yoshimura (Eds.), Advances in Climate Physiology (Tokyo: Igaku, 1972): 197-218.

[37]B. Cannon and J. Nedergaard, "The Biochemistry of an Inefficient Tissue: Brown Adipose Tissue," Chapter in Essays in Biochemistry, eds. P. N. Campbell and R. D. Marshall (London: Academic Press, 1985): 110-164.

[38]Frim, 19-32.

[39]J. S. Garrow, "Exercise, Diet, and Thermogenesis." Chapter in Nutrition and Exercise, ed. M. Winick (New York: Wiley and Sons, 1986): 51-65.

[40]B. Hellstrom, K. Berg and F. Lorentzen, "Human Peripheral Warming During Exercise in the Cold," J Appl Physiol 29 (1970): 191-199.

[41]S. I. Hong and E. R. Nadel, "Thermogenic Control During Exercise in a Cold Environment," J Appl Physiol 47 (1979): 1084-1089.

[42]R. R. Gonzalez, "Work in the North: Physiological Aspects," Arctic Medicine Research 44 (1986): 7-17.

[43]I. T. Campbell, "Nutrition in Adverse Environments, 2, Energy Balance Under Polar Conditions," Human Nutrition: Applied Nutrition 36A (1982): 165-178.

[44]F. Golden and M. J. Tipton, "Human Adaptation to Repeated Cold Immersions," J Appl Physiol 396 (1988): 349-363.

[45]Brooks and Fahey.

[46]D. S. Miller, "Factors Affecting Energy Expenditure," Proceedings Nutritional Soc 41 (1982): 193-201; Gonzales, 7-17.

[47]S. Itoh and A. Kuroshima, "Lipid Metabolism of Cold-Adapted Man," Chapter in Advances Climatic Physiology, eds. S. Itoh, K. Ogata and H. Yoshimura (Tokyo: Igaku, 1972): 260-277.

[48]J. A. LeBlanc, "Metabolic Responses to Cold and Hypoxia," Chapter in Hypoxia and Cold, eds. J. R. Sutton, C. S. Houston and G. Coate (New York: Praeger, 1987): 33-34.

[49]E. Hey, "Thermal Neutrality," British Medical Bulletin 31 (1975): 69-74.

[50]Itoh and Kuroshima, 260-277.

[51]Michael Stroud, "Increased Basal Metabolic Rate After Sustained Exercise in a Cold Environment," Lancet (June 6, 1987): 1327.

[52]B. A. Timmons, J. Araujo and T. R. Thomas, "Fat Utilization Enhanced by Exercise in a Cold Environment," Med Sci Sports Exerc 17 no. 6 (1985): 673-678.

[53]J. F. Patton and A. Vogel, "Effects of Acute Cold Exposure on Submaximal Endurance Performance," Med Sci Sports Exerc 16 (1984): 494-497.

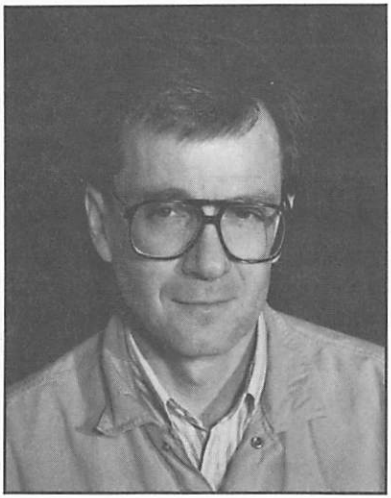
[54]T. T. Romet, P. J. Shepard and J. Frim, "The Metabolic Cost of Exercising in Cold Air (-20 degrees Centigrade)," Arctic Medical Research 44 (1986): 29-36.

[55]Kamisky, Knowlton, Perkins and Hetzler, 603-609.

[56]Timmons, Aravjo, and Thomas, 673-678.

KETCHIKAN

Jim Petit



It rained thirteen feet the year I was there.
Some laughed at the moody drizzle that fell
For weeks in a grey half-light, spilling from
Everything that cupped or puddled. It

Entertained some when sleet pelted the warm
Windows like fine sand—I never cared for
It nor those misting clouds that fell from the
Heavens, covering the town like a dark

Canvas. Icy December rain. The soft
Side of a strong arm would hug a heavy
Coat. A wet fog, dripping from moss covered
Roofs, softened fir-planked streets and wooden walks

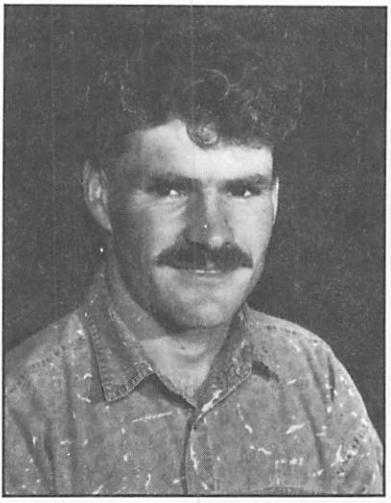
Until they were slippery as oiled glass.
Spilling, too much for gutters, this bloated
Wetness that swelled old wood and turned bare metal
Brown, would flood the night with its hiss and splash.

An old man said it ended his marriage.

Jim Petit's poem was written for English 652, "Graduate Writers' Workshop: Poetry," Thomas Sexton, Professor, UAA English Department.

LYING AS A MODE OF GOVERNANCE THE NIXON ADMINISTRATION AND CHILE

Chris Brehmer



And ye shall know the truth and the truth shall make you free.—John 8:32 — inscribed on the marble wall of the main lobby at CIA headquarters, Langley, Virginia.

American involvement in the events preceding the military coup in 1973 that overthrew Chilean president Salvador Allende raises the problem of credibility within the Richard M. Nixon administration and the Central Intelligence Agency (CIA). The U.S. actively intervened in the internal affairs of Chile, so it says, to protect the interests of the United States. This essay will trace the involvement of the CIA in Chile and its methods of bribery, lies, deception, assassination plots and coup attempts to stop a democratically elected president from assuming power. It is a sad and all too common example of America's ideals, democracy and freedom, coming into direct opposition to our international actions of hostility and oppression towards others.

The CIA's clandestine activities started on September 4, 1970, with a plan to prevent Allende's election. When this failed, the Agency tried to destabilize Chile so as to make a military coup likely. When the truth began to leak out in 1974, a year after Allende's murder, the denials of CIA and Nixon administration officials were finally called into question.

United States involvement in Chile, however, suggests more than contempt for the sovereignty of other peoples. It also suggests the degree to which lying became official government policy during the Nixon Years.

On September 4, 1970, Salvador Allende won a plurality of 36.3% in the national elections. He was closely followed by the conservative Allessandri, who accumulated

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Chris Brehmer's paper was written for History 477, "Senior Seminar," Kenneth O'Reilly, Professor, UAA History Department.

35%.[1] He was the first Marxist to be democratically elected to a Latin American nation's highest post.

Allende advocated the creation of a socialist government through peaceful and democratic means that became known in Latin America as the *via pacifica* (peaceful road). He was opposed to a Cuban style violent revolution and was dedicated to using the Chilean Constitution to bring about his goals.

Allende was a strong nationalist. He attempted to have non-aligned foreign policy and was unwilling to subordinate Chile to any outside interests. He opened up cordial relations with Havana, Moscow, and the east bloc, and at the same time he wished to retain an open door with the United States. However, to create an independent Chile, it was necessary to curtail the excesses of the United States presence in his country. This would undoubtedly have a negative impact on U.S.-Chilean relations.

The Allende administration proposed a six-year program to quicken the pace of land reform and the nationalization of industry, and at the same time pursued wage and price policies that dramatically increased the income of the nation's poor. His administration expropriated the largest banks and companies many of which were foreign owned. International Telephone and Telegraph (ITT), Anaconda and Kennecott Copper were U.S. corporations that the Allende government targeted for expropriation.

These policies strengthened Allende's support among the lower classes, but increasingly alienated the Chilean upper class, much of the middle class, the Chilean military and the United States.

The Nixon administration viewed the Allende government's socialist and independent course as a direct threat to the national security of the United States. They believed that Chile, under Allende, would become a foothold for communism on the continent and that it would be a training ground for subversive activity. With Chile to the southwest and Cuba to the northeast, Latin America would be engulfed in a "red sandwich."[2] As they saw it, this would invite a Soviet presence on the continent that would upset the balance of power.

A CIA memorandum at this time concluded that the United States had no vital interest in Chile and that none of the perceived threats were valid. Nevertheless, the executive branch decided to use the CIA to intervene in Chile's political and economic affairs. Henry Kissinger summed up the administration's attitude. "I don't see why we need to stand around and watch a country go Communist due to the irresponsibility of its own people."[3]

In the 1970 elections, Allende did not win 50% of the popular vote. The Chilean Constitution stipulated that the two candidates receiving the highest percentage of the votes must run again before the Chilean Senate. According to the tradition, the candidate who won the national election was inevitably elected by the Senate. After the national elections therefore, Chileans assumed that their new president would be Salvador Allende.

This was not the assumption that the White House made. There was an interim period of seven weeks between the two elections of September 4 and October 24. On September 15, Nixon met secretly with the Director of Central Intelligence (DCI) Richard Helms, and Secretary of State Henry Kissinger. He authorized Helms to "determine whether it was possible for a political opponent of Mr. Allende's to be elected president by the Chilean Congress." He further informed Helms, "that to be successful, any efforts to defeat Allende would have to be supported by the military factions in Chile." He instructed Helms and Kissinger that "any action which the United States could take that

might impact adversely on the Chilean economy should be taken as an additional step in preventing Mr. Allende from becoming president," adding that the American Embassy in Chile should not be involved.[4]

Nixon's instructions led the Agency to believe that it had "carte blanche authority" to take action in Chile. Helms later stated that, "if I ever carried a marshal's baton in my knapsack out of the oval office it was that day."[5]

Although in specific cases the Agency acted on its own, it did not act behind the back of the executive branch. The 40 Committee, a sub-cabinet body of the executive branch, reviewed and approved covert action and provided funds for CIA activity in Chile. From 1970-1973 the 40 Committee appropriated more than $8 million for action against the Allende government.

In a typical meeting, Director of Central Intelligence Richard Helms would present the 40 Committee with a proposal. Often the Committee members were insufficiently briefed as to the issues of upcoming meetings. As a result, their decisions were based almost exclusively on the information that Helms or the chairman of the committee, Kissinger, provided. Helms and Kissinger directly reflected the views of the president.

The 40 Committee authorized Track I. Track I was a plan to use legal, constitutional means to prevent Allende's election by the Senate. The Ambassador to Chile, Edward Korry, was to induce enough members of congress to vote for Allende's opponent, Allesandri. Once elected, Allesandri would immediately resign thus paving the way for a special election in which the incumbent President Frei would legally become president.

Frei was the presiding president and had the only chance of beating Allende at the polls. According to the constitution a president could not be elected in two consecutive elections. Allesandri's election and subsequent resignation would legally allow Frei to run for president again.

The inducement to get the Chilean Congress to accept this plan would be a $250,000 slush fund. It would be at Korry's disposal to disburse as bribe money. Influential figures in Chile and abroad were prompted by the CIA to contact Frei to convince him to buy into the so-called Frei Gambit. Frei however, disavowed the plan. He objected to its CIA origins and to its interference in the constitutional election process.[6]

At the same time the CIA embarked on a plan called Track II. Track II was a covert operation to organize a coup within the Chilean military and thus prevent Allende's election. It specifically targeted Allende supporters within the government and the military.

General Schneider was commander in chief of the army and a constitutionalist. He supported the civilian government in power. Schneider was considered an obstacle in preventing Allende from assuming power.

The CIA supplied various factions of the military with "machine guns, tear gas grenades and five hundred rounds of ammunition" to stage a successful abduction of the general.[7] The Agency offered up to $100,000 if the operation was a success. On the night of October 22, after two unsuccessful attempts, the general's car was ambushed. His chauffeur was instantly killed and Schneider was fatally wounded. He died three days later.[8]

Track's I and II were an umbrella operation that not only included the Frei-election Gambit and the abduction of General Schneider, but utilized any means, excluding direct

military intervention, to discredit Allende and upset his election. A spoiling operation was embarked upon to carry out this end.

Propaganda techniques were dubbed spoiling operations by the CIA. They had two objectives: (1) to undermine Communist efforts to prevent a leftist takeover of the government; and, (2) to strengthen non-Marxist political figures and forces to present an alternative to Allende's party. In a six-week period up to and through the October elections, the CIA was responsible for 726 articles, broadcasts, and editorials, and spent a total of $2 million.[9]

The propaganda activities failed to prevent Allende's election, but did help to polarize public opinion into two camps. It also helped to create an atmosphere of economic instability that was to have future implications for Chile.

The coup plots, political manipulations, and anti-Allende propaganda campaigns that took place between the September 4 national election and the October 24 congressional elections failed to prevent Allende from being elected and inaugurated. The White House failed to realize that, in 1970, Allende had the overwhelming support of the workers, as well as the support of the Chilean congress and the military. Opposition came from those who had the most to lose from a socialist program; the middle and upper classes, big business and foreign investors. At this time the opposition was not a majority.

Increased attempts to rouse the opposition against Allende would be useless without the military being brought over to the opposition's side. The role of the CIA would have to increase in the months ahead.

Nixon stated in a report to Congress that, "Our bilateral policy is to keep the lines of communication between the United States and Chile.... In short, we are prepared to have the kind of relationship with the Chilean government that it is prepared to have with us."[10]

The United States government initiated four main thrusts of policy against the Allende administration once he took office. Although overtly U.S. policy appeared friendly, the covert U.S. policy consisted of: (1) financial and technical support to opposition political parties of Allende; (2) anti-Allende propaganda programs; (3) economic embargoes against Chile; and (4) covert military support to anti-Allende personnel.

More than $4 million that was approved by the 40 Committee was allegedly spent to support opposition political parties. Most of the money went to President Frei's moderate party, the Christian Democrats (PDC), and the right wing National Party (PN), as well as smaller splinter groups.[11]

The CIA also spent $2 million on propaganda that utilized existing media links. El Mercurio, a right wing Santiago newspaper backed by the CIA, was given $1.5 million between 1970 and 1973.[12]

United States economic aid was cut off, lending credits were denied, and the U.S. enlisted the efforts of international financial institutions and private firms in tightening the economic squeeze on Chile.

The U.S. government refused to recognize the expropriations of the copper companies although these expropriations were legal by international law. Instead, they supported the U.S. copper companies' claims when those companies sued Chile in International Court. There is also speculation that the U.S. in concert with the copper companies, tampered with the worldwide price of copper in 1971. Copper reached record lows that were detrimental to the Chilean economy.[13]

New York Times sources say that the Agency passed "millions of dollars" to provide strike benefits and other means of support for anti-Allende strikers and workers. Support for a truck strike that lasted twenty-six days in the fall of 1972 was heavily subsidized by the CIA. The strike seriously disrupted the economy and led to other labor crisis. Direct subsidies were given to middle class shopkeepers and taxi strikers in the summer of 1973. The strikes involved more then 250,000 people.[14]

The Church Committee, a congressional investigation organized to look into alleged CIA involvement in Chile, found these undisputed facts: (1) the 40 Committee did not approve any funds to be given directly to the strikers; (2) the strikes could not have been maintained without outside financing; and, (3) in at least one instance, the CIA passed funds to a group they knew would pass money to the strikers.[15]

Finally, the CIA has been linked to covert military support of anti-Allende personnel. The Agency had operatives working directly with the Chilean military. The purpose of these contacts, according to CIA headquarters in Langley, Virginia was to keep military officials "informed and on the alert." The CIA station in Santiago added that the ultimate objective of the operation was a military coup. Headquarters disagreed and said that the 40 Committee would not agree to such a suggestion and that the objective of the operation was to monitor coup plotting and not to plan a coup. They did, however, acknowledge that it was difficult to draw a line between the two goals.[16]

The Church Committee reported that the CIA efforts went beyond the mere collection of information. It attributed Agency efforts as overt and covert opposition to the Allende government. The Track II operation left little doubt that the U.S. would not be hostile to such a venture.

On September 11, 1973, the presidential palace in Santiago was bombed by coup plotters and President Allende was killed. The military junta which established itself upset a democratic tradition that has existed in Chile since 1830. The Chilean military had a tradition of supporting the civilian government and the constitution which governed the country. There had only been two brief interludes of military rule. At both times the military had returned the reins of power to the civilian authorities. When General Pinochet and the army overthrew the Allende government and consolidated power in 1973, a new era was introduced into the political tradition of Chile.

In the aftermath of the coup, the 40 Committee cut back its funding for covert action. All of the anti-Allende projects were cancelled. Major efforts were made to sell a positive image of the new junta. Within months Chile was receiving massive foreign economic aid, and U.S. military expenditures soared. The CIA collaborated with the junta to organize and implement new economic and political policies.[17]

The White House would like to have seen the story end here. The veil of secrecy that had gone into the massive covert involvement against Allende was still unknown to the public.

In August of 1974, Nixon resigned as president in the midst of the Watergate scandal. President Ford gave him a full pardon and addressed the question of U.S. intervention in Chile. At a news conference he stated that funds were spent only to "help assist the preservation of opposition newspapers and to preserve opposition political parties" in Chile. Ford also stated that the funds were spent "three to four years ago" suggesting that after Allende's election all CIA activities authorized by Nixon and the 40 Committee had been halted.[18]

Up to that time Kissinger, Helms (who was replaced in 1973 by William Colby), and the Ambassador to Chile, Edward Korry, denied under oath before congressional hearings any U.S. involvement in Chile between 1971 and 1974. All of these testimonies were found to be false.

In 1974, William Colby had testified in a closed session of the House Armed Services Committee. He had mentioned the Track I and II operations and the attempts at economic and political destabilizations. He later claimed that he had not used the word "destabilization." Colby admitted a "continuous Central Intelligence Agency involvement in the internal politics of Chile from 1962 to 1973." He stated that the 40 Committee had authorized $12 million to be spent to prevent the election of Allende. When that failed, they authorized the CIA to bring about the downfall of the Allende government.

"The CIA activities in Chile were viewed as a prototype or a lab experiment, to test techniques of heavy financial investment in efforts to discredit and bring down a government."[19]

Senator Frank Church presided over congressional investigations in 1975 and 1976. Subsequently, Richard Helms, Henry Kissinger and Richard Nixon were called to testify.

Richard Helm's testimony is an example of the widening credibility problem surrounding events in Chile. When he was asked if the CIA had ever tried to overthrow the government of Chile or if any funds were passed from the CIA to opponents of Allende, he denied it. At a later hearing he admitted to lying about CIA involvement in Chile. He tried to defend his lies by saying that the Congress had no right to honest answers because the Congress had no right to ask the questions that it had. He was later charged with perjury.

The Church Committee concluded that, despite his denials, Henry Kissinger knew of the covert action employed in Chile. Furthermore, he personally "directed a far-reaching Nixon administration program designed as economic retaliation against Chile" after the election of Allende.[20] His testimony was called into question but no further followup investigations ever took place.

The Church Committee assumed that Richard Nixon knew of the covert activities in Chile and that he specifically instructed Helms to go ahead with coup plotting in the form of Track II without informing the U.S. Ambassador to Chile, the Congress, the State Department or the 40 Committee. Kissinger was the only one who knew everything that Nixon ordered Helms to do.

In March of 1976, the Nixon Interrogatories were submitted by Nixon to the Church Committee. In them he denied any knowledge of Track II or that he had instructed the CIA to act without 40 Committee approval. He denied that during the September 15, 1970, meeting with Helms he had used any of the phrases from Helms' notes:[21]

> One in ten chance perhaps, but save Chile
> worth spending
> no involvement of embassy
> $10,000,000 available more if necessary
> full-time job—best men we have
> game plan
> make the economy scream
> 48 hours for plan of action

The Church Commission found that Nixon denials were not in keeping with other testimonies. He had authorized the CIA to "play a direct role in organizing a military coup in Chile."[22] They concluded that the U.S. had intervened covertly in Chilean affairs. Although they found that the CIA had worked with coup plotters they found no evidence to implicate the CIA in the final coup that killed Allende and thousands of others. It is the Church Commission's judgement that the CIA may have overstepped its grounds in the 1970 coup attempts. As to the future of covert action, however, "it should be resorted to only to counter severe threats to the security of the United States. It is far from clear that that was the case in Chile."[23]

The problem of credibility within the executive branch and the CIA remains a serious problem to the present day. The government claims that it has national security interests to protect. It claims that the world is so complex that only a few enlightened elites can be trusted to deal with these problems. Cloak and dagger operations must be reserved as a tool for these men. They claim that it is a necessary alternative to military intervention. They tell the world that the U.S. must employ these tactics to protect the security of our country.

The greatness of the American system of government rests on the ideals and practice of democracy and freedom. We vehemently denounce the evils of communist oppression and tyranny and assert that the United States must make the world safe for democracy.

In Chile the U.S. helped to destroy a government that the Chilean people had chosen for themselves. Henry Kissinger summed up the view of many American leaders of the time. "I don't see why we should stand by and watch a country go communist due to the irresponsibility of its own people."

This attitude by American leaders has helped to cause the American public and the world to question the credibility of the United States. The credibility gap continues to widen as the truth about our involvement in other nations' affairs and cover-ups like Watergate and the Iran-Contra affair continue to surface. We cannot say that we stand for freedom in one breath and help to smash it in another and expect the world to believe it.

As long as the U.S. government employs secrecy and deception over openness and honesty, the American people will feel that they have no part in the decision-making process that a democracy is supposed to ensure. The world will see the hypocrisy in our democratic rhetoric. Without truth and democracy, the American dream will die.

ENDNOTES

[1]Nathaniel Davis, The Last Two Years of Salvador Allende (New York: Cornell University Press, 1985), 5.

[2]Ibid., 32.

[3]Seymour Hersh, "Kissinger and Chile", Washington Post, September 20, 1974, sec. A, 12.

[4]Senate Select Committee, Final Report, Interrogatories for Former President Richard M. Nixon, 94th Cong. 2d Sess. April 23, 1976, Book 4, 159.

[5]Thomas Powers, The Man Who Kept the Secrets: Richard Helms and the CIA (New York: Alfred A. Knoph 1979), 235.

[6]This plan was considered a legal method of swaying the Chilean Congress. Bribery has never been accepted as a legal practice in the U.S. How could Nixon have thought it would be legal in Chile?

[7]Senate Select Committee, Church Committee, 121.

[8]Although the Agency denies that it supported an assassination of the General, it knew that such a possibility existed in an abduction attempt. Track I & II show a flagrant disregard for the Chilean people and their political institutions.

[9]Senate Select Committee, Church Committee, 171.

[10]Senate Select Committee, Covert Action, 173.

[11]Ibid., 178.

[12]Ibid.

[13]Ibid., 180-181.

[14]Hersh, 12.

[15]Senate Select Committee, Covert Action, 178.

[16]Ibid.

[17]It becomes painfully obvious that, although Chilean generals carried out the coup that actually overthrew Allende, the economic and internal turmoil was largely due to the efforts of the U.S. Without the constant assurances of the U.S., it is doubtful whether a coup would have taken place. We destroyed a foreign democracy to protect our national security.

[18]Senate Select Committee, Covert Action, 178.

[19]Congress, House Committee on Armed Services, Inquiry into matters regarding classified testimony taken on April 22, 1974, concerning the CIA and Chile. 93rd Cong. 2d Sess. 25 September 1974, 33.

[20]Seymour Hersh, "Kissinger Called Chile Strategist," New York Times, 15 September 1974, sec 3A, 1.

[21]Powers, 235.

[22]Senate Select Committee, Covert Action, 172.

[23]Ibid., 203.

TROPHIES

Julia V. Williamson

My uncle shoots animals. He has them stuffed and puts them in his basement. Sometimes he just has the heads mounted and hangs them on the wall.

Last week we drove down to see him and his wife and their kids Becky Jane and Roland.

"You all come on down to the basement," Uncle Ronnie said. "I got a new piece in my collection to show you."

"Ronnie, they haven't been here five minutes." Aunt Charlotte stood in the kitchen doorway with a potholder in her hand. "And I'm just about ready to put lunch on the table."

"Oh, it won't take but a minute. I bet Doug would like to see it, wouldn't you, Doug?" He clapped me on the shoulder.

"I guess so," I said.

Aunt Charlotte looked at my mom and shrugged her shoulders and laughed. She has a little thin high laugh, like ice in a drink hitting the glass.

"I'll come right back up and give you a hand with lunch," my mom said.

Becky Jane opened the basement door. "Are you going to show them the sheep, Daddy?"

"I got this piece on my last trip up to Alaska." Uncle Ronnie turned on the light. Looking down the steps I could see the grizzly bear at the bottom standing on its hind legs with its mouth open.

"You into rustling now, Ronnie?" my dad said.

Behind me I heard my mom say, "My goodness, Roland, you sure have grown a lot since last summer. Are you ten yet?"

"Yes."

"It's not a sheep, Chuck, it's a Dall sheep."

"A what?" said my dad.

"Daddy shot it in Alaska and he had to carry it all the way down the mountain and it was night and he cut off the head and he got all bloody and—."

"Hush, Becky Jane, let me tell it. Now, I went up with a friend of mine who's just left for a hunt in Kenya. . ."

The sheep head was on the wall between two deer heads. It was bigger than you'd think a sheep head would be. It had brown horns that curled around like snail shells.

"So are you in the fifth grade now, Roland?" my mom asked.

"No."

"He got left back this year," Becky Jane put in.

My mom smiled at Roland. "Well, that's all right, you've got plenty of time."

"It was a lucky shot," Uncle Ronnie was saying, "because it was about dark by then. I was mostly firing by sound."

Julia Williamson's paper was written for English 662, "Graduate Writers' Workshop: Fiction," Ronald Spatz, Professor, UAA English Department.

His eyes had kind of a shine to them, like they always did when he talked about hunting or looked at his trophies. I looked away to the other side of the basement. The grizzly bear that you could see from the stairs was on a concrete platform, so that you saw it first thing when you opened the basement door. It didn't look that good when you were actually in the basement, because it was too close to the wall that had the moose and caribou heads on it. There were two moose with one caribou in between them. The caribou's nose was almost up against the grizzly bear's shoulder. It used to make me a little sad to look at them all. I knew their eyes were only glass, but they looked like they were thinking serious thoughts.

"Well, Bill and I rigged up a stretcher to drag the sheep on."

"Have you won any merit badges lately, Roland?"

"No."

"He's not in the Scouts anymore," Becky Jane started to explain.

Roland wandered around me and stood underneath the sheep head. He reached up and started running one finger along a horn.

"And let me tell you, time we got down off that mountain, with the frozen blood all over us, we were—Roland, how many times do I have to tell you don't touch the trophies!"

Roland took his hand down and walked away.

"Marion, come up so you can see," said Uncle Ronnie. He nodded at the sheep. "He has a square head that looks like it's just sitting on his shoulders with no neck in between. Now, just look at those big old horns, will you?"

"They're certainly big," said my mom.

"Don't they knock their horns against the horns of other sheep in the spring?" said my dad.

"Roland, you better stop that before Daddy catches you."

I turned around and saw Roland hanging by one hand from a moose antler. When he spotted me watching, he dropped to the floor.

"How 'bout it, Doug?"

I turned back. "Sorry?"

"How'd you like to go on a hunt with me sometime?"

"I don't know," I said.

"Sure would be great to have you along. You're what, fifteen now? And real big and strong, too." He nodded at my shoulders just like he had at the sheep head. "Yeah, you would've been a big help getting the Dall sheep down the mountain."

Roland was standing there between the moose and the caribou. He looked at Uncle Ronnie with no expression on his face. Then he turned around, jumped up, and grabbed hold of the caribou. He swung himself up on top of it, so that he was sitting on its neck.

My mom touched my arm. "Doug, go lift him down before your uncle sees."

Roland lay down along the caribou's neck until his face was looking out between the antlers. I started towards him. Becky Jane giggled. She laughs just like her mom.

"ROLAND!"

Roland started to scramble off the caribou head. His legs were kicking under its neck, but he was still hanging on, when there was a ripping sound and the caribou head fell off the wall.

My mom was over there in a second. "Roland, are you all right?"

He was lying flat on his back with his chest under the neck of the caribou. The plaque that the head was mounted on was jammed up against the concrete platform that the grizzly bear stood on. On the wall there was a dark space the shape of the plaque, with some ragged nail holes in it.

"Mama! Mama!" Becky Jane ran up the stairs. "Roland was climbing on the head and it fell on him!"

My mom was kneeling next to Roland's head. "Roland? Can you hear me? Are you all right?"

"Roland," Uncle Ronnie said, "you all right?" Standing over Roland he was almost as tall at the grizzly bear.

Roland opened his eyes. "I think so."

"Of all the jackass things to do—I've told you time and again—haven't I told you to leave the trophies alone?"

Roland closed his eyes.

"Now, Roland," said my mom, "are you sure you're all right? Does it hurt anywhere?"

"I don't know."

"Here, let's get this thing off him." My dad reached for the caribou head.

"No, not by the antlers. Grab it underneath," Uncle Ronnie said. He took the other side and they tried to lift the head together.

"It's really stuck in there," my dad said.

Aunt Charlotte came running down the stairs. She had a big serving spoon in her hand.

"Roland honey, are you all right, Roland?"

"He said he's all right. Come on, Chuck, let's get this thing up." Uncle Ronnie and my dad bent down and heaved up on the caribou head.

My dad grunted. "How could the thing get jammed this tight?"

It was getting kind of crowded around Roland's head, with Aunt Charlotte and my mom on their knees and my dad trying to stand out of their way.

"Roland sweetheart, do you hurt anyplace? Does your chest hurt? Does your tummy hurt?"

"I don't know." He was looking a little sick, and real small and thin with his little round face and bony neck and arms next to all the adult legs. The caribou head covered his chest like a box that a magician puts a lady in before he saws her in half.

My dad took hold of Roland's wrists. "Let's see if we can pull you out from under there, Roland."

He gave a tug and Roland howled.

My dad let go. "No lung damage, I guess."

"Doug, call an ambulance," Aunt Charlotte said.

I was nowhere near the stairs yet when Uncle Ronnie said, "We don't need any ambulance. He couldn't yell like that if there was any pressure on his chest. All we got to do is get the caribou head up off him and he'll be all right."

"Okay, Doug, run up to the garage and get a saw." Aunt Charlotte smoothed Roland's hair back with the hand that didn't have the serving spoon in it. "Roland honey, we'll have that awful thing off you in just a minute."

"Doug, don't you do any such thing. I'm not sawing up my caribou for no reason."

"Your son is a reason!" Aunt Charlotte's voice sounded like a window breaking.

"I didn't say—." Uncle Ronnie looked at my dad for help. "It's just that if we can get it off without damaging it—."

"Look at it," my dad said. He pointed to the caribou's nose, which was a little flattened against the concrete platform. "You set that concrete into the floor, didn't you? Well, you can take a sledge hammer and break it up, or you can knock out a piece of the wall, or you can saw that head apart, because if you and I can't budge it, it's wedged in there for good."

Roland had closed his eyes again. He was breathing so loud I could hear him.

Aunt Charlotte said, "Ronnie," like she was about to cry. My mom put a hand on her arm.

"Doug, you come give us a hand," Uncle Ronnie said. So I got down next to him and we all three shoved up on the caribou head. It didn't move at all, and when I stopped pushing I fell back on Roland's leg and he yelled.

"Ronnie," said my dad, "you going to get that saw or am I?"

Uncle Ronnie looked at him, then at me, then at Aunt Charlotte. He said, "But there's got to be some—."

The phone rang upstairs.

"Becky Jane, you answer it," Aunt Charlotte said.

I listened to Becky Jane's feet on the stairs and to Roland's breathing.

"You see." Uncle Ronnie turned his face all around the room. I guess he didn't like how my dad and Aunt Charlotte and my mom were looking. He wound up talking to me. "That caribou head means a lot to me. It was the first big game I ever got—I mean, deer don't count, you can get deer anywhere, but the caribou was my first big hunt."

"Daddy, it's Mr. Robinson, he wants to talk to you," Becky Jane yelled.

Uncle Ronnie started past the grizzly bear to the stairs.

"You don't need to talk to your taxidermist right now," Aunt Charlotte said.

Uncle Ronnie looked at her on her knees by Roland's head. Her lips were pressed tight together and her left hand was in a fist around the serving spoon.

"Becky Jane, tell him I'm busy and ask if you can take a message."

"Roland, honey, darling, you still feeling all right? Do you hurt anywhere?"

Uncle Ronnie took a step toward Roland and the caribou, then stepped back away again, like he was thinking that no place in the basement looked like a good spot to go to.

"It—it MEANS something, your first big trophy. It's something you can always look back on and say, I did that. It's important for a man to know that he's done things in his life."

My mom got up from the floor and stood next to my dad. Her skirt was crinkled but she didn't smooth it out. Roland breathed out and in.

"And sure, if Roland was really hurt or something, that'd be different, I wouldn't—."

"Daddy, he says he thinks he should talk to you."

Uncle Ronnie started for the stairs again, a little faster this time.

"Ronnie don't you leave this room." Now Aunt Charlotte's voice sounded like ice cracking when you walk on it. Uncle Ronnie looked at her again. Roland breathed in.

"Becky Jane, you take a message, you hear?"

Aunt Charlotte looked back down at Roland. "Just hang on now, sweetheart, it won't be long."

My mom whispered something to my dad. He nodded and said, "So how about

that saw, Ronnie?"

Uncle Ronnie turned his eyes to the far wall where the Dall sheep was looking at him. Everything was looking at him—the deer, the bears, the moose, the foxes, even the mallard and the Canada geese—everything but the grizzly that was growling up the stairs. Roland opened his eyes. The glass eyes in the animal heads looked a lot more alive.

"Couldn't we try," Uncle Ronnie said, "some grease or something? Mayonnaise or maybe. . . ."

Becky Jane came down the stairs. Her steps were as slow as Roland's breathing.

"What did Mr. Robinson say?" Uncle Ronnie asked her quickly. Becky Jane drew a deep breath. "He said he thought you should know that Roland brought him something this morning and asked him to mount it." She went over right next to her mother and stood there with her hands in the pockets of her jeans.

"Roland?" Uncle Ronnie shook his head like a dog coming in from the rain. "Roland brought him a trophy to mount?"

"Yes."

Becky Jane was shaking a little, like she was about to cry.

"Did he say what it was?"

"He said Roland brought him a garbage bag and inside it there was the head of a golden retriever with five BBs in it."

Uncle Ronnie breathed in and held it. I couldn't hear Roland breathing. I couldn't hear anything.

After a while I heard a noise like a single drumbeat. It was the serving spoon dropping out of Aunt Charlotte's hand onto the rug. She touched Roland's cheek.

"Oh, my baby."

Roland kept lying there with his eyes just open and not doing anything.

Uncle Ronnie's mouth was hanging open a little, but not like he was about to say anything. More like he was never going to say anything again. He swiveled slowly around, facing the deer and the bears and all, and when he was turned all the way around, he started up the stairs.

"My God." My dad put a hand up to his face. "Just the head." I don't think he knew that anyone else could hear him.

My mom knelt down and put an arm around Aunt Charlotte's shoulders. Becky Jane giggled once and then started to cry. I felt that if I tried to move or talk, I wouldn't be able to.

And Roland just lay there perfectly still till Uncle Ronnie came back down with the saw. As he walked over to Roland, he was looking at his feet, like they wouldn't move if he didn't keep watching them. I couldn't see his eyes. He positioned the blade on the caribou's neck.

"Why don't you let me do it?" my dad asked.

"I'm gonna do it," Uncle Ronnie said. He pushed the saw forward. The blade made a ripping sound. Tiny brown hairs floated down through the air.

I wondered if Roland would ever close his eyes.

"JINGLE JIVE" A RHYME AND RHYTHM APPROACH TO TEACHING BASIC MATH FACTS 1-10 FOR THE SLOW LEARNER/SPECIAL EDUCATION STUDENT

Lynda Lu Hall

Special education carries with it a weighty responsibility to meet the educational needs of those students requiring it. Public Law 94-142, passed in 1975, gives the right to each student qualifying for special education to learn in the least restrictive environment, and in a manner that meets his/her individual needs through specific individualized programs.

In the past, those with learning disabilities had few, if any choices concerning their educational needs, as little was then known about educating those with learning disabilities or handicaps.

In its early stages, the field of special education relied on the scientific approach to develop and build a basic body of knowledge. An outcome of this approach was development of systematic instruction and the application of behavioral principles in the classroom. Thus, according to Harris,[1] it is by focusing on the behavior of each student that the best information about the individual needs and abilities are gained.

In addition, White and Haring,[2] state that the specific curricula, materials and instructional tactics which are required in teaching will vary with the needs of the pupil and the limitations of the situation in which instruction takes place.

In answer to one of those varying instructional tactics and material needs, an instructional tool to assist in teaching the basic concepts of math has been developed. It must be kept in mind that this is but one method, one approach, and will not work for all, but adds to the available materials that may be adapted to meet the specific learning needs of the slow learner or those with learning handicaps.

Through the utilization of rhyme, rhythm, auditory and visual stimulus, the basic math facts are presented in a method coined "Jingle Jive."[3] Each math fact has a jingle

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Lynda Lu Hall's paper was written for Education 419, "Exceptionalities: Culture and Learning," Margaret Lowe, Professor, UAA Education Department.

or rhyme that correlates with the product or answer, and is presented verbally on cassette tape. Each answer throughout the math facts that is the same, has the same jingle attached to it, as an additional method of reinforcement. In addition, for those that may need a visual and kinesthetic reinforcement, pictures to color that coincide with the jingle, have been included.

To evaluate the success of this method, the same procedure on cassette tape and paper is followed except the product or answer is left out to be supplied by the student in a manner that befits his/her capabilities and/or handicaps. This may include verbal, written or through the use of objects to depict the answer.

As continual assessment, adaptation and evaluation is needed throughout the educational process; new educational material is constantly needed to assist in meeting the individual and unique needs of those that may be handicapped in one way or other. "Jingle Jive" is just one more possible method of reaching and meeting those individual learning needs.

Samples of "Jingle Jives" are shown below.

Addition Sample:

1+1 tie your shoe
Cause 1+1 equals 2

1+2 let's climb a tree
Cause 1+2 equals 3

1+3 now shut the door
Cause 1+3 equals 4

1+4 now give me some jive
Cause 1+4 equals 5

1+5 now pick up sticks
Cause 1+5 equals 6

Subtraction Sample:

4−4 now don't be a hero
Cause 4−4 equals 0

4−3 is so much fun
Cause 4−3 equals 1

4−2 now tie your shoe
Cause 4−2 equals 2

4−1 let's climb a tree
Cause 4−1 equals 3

4−0 now shut the door
Cause 4−0 equals 4

Multiplication Sample:

9×1 now I feel fine
Cause 9×1 equals 9

9×2 turns me green
Cause 9×2 equals 18

9×3 won't get you to heaven
Cause 9×3 equals 27

9×4 miners use picks
Cause 9×4 equals 36

Division Sample:

8 goes into 8 is so much fun
Cause 8 goes into 8 exactly 1

8 goes into 16 now tie your shoe
Cause 8 goes into 16 exactly 2

8 goes into 24 let's climb a tree
Cause 8 goes into 24 exactly 3

8 goes into 32 now shut the door
Cause 8 goes into 32 exactly 4

INSTRUCTIONS FOR COLOR SHEETS

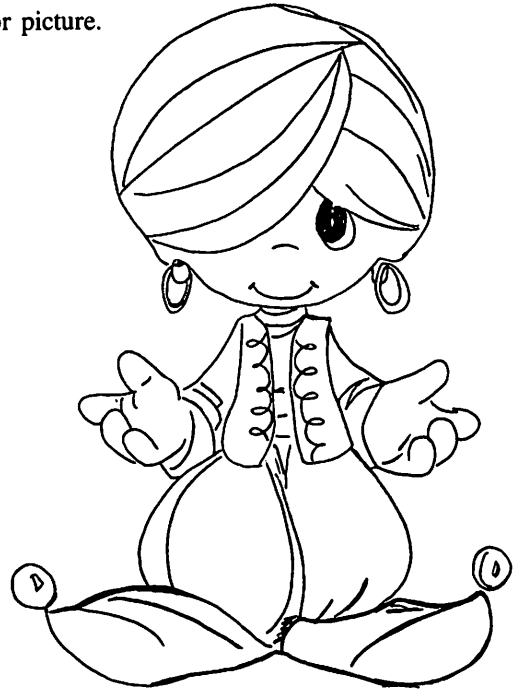
Teacher: Have the student write in the math problem he/she is working on that corresponds with the picture and rhyme.

Example: _____ my friend Kevin
Cause _____ equals 11

Student: 1+10 my friend Kevin
Cause 1+10 equals 11

Review concept with student, explain picture if necessary. A different picture my be substituted if the teacher feels the concept is more clear to the student.

Have student color picture.



_____ Now give me some jive
Cause _____ equals 5

ENDNOTES

[1]N. G. Harris, Exceptional Children and Youth. (Columbus, Ohio: Charles E. Merrill Publishing Co., 1982).

[2]O. R. White & N. G. Haring, Exceptional Teaching, 2nd ed., (Columbus, Ohio: Merrill Publishing Co., 1980.)

[3]Author's note: This paper is only a very small sample of the completed project which is close to 100 pages in length.

EVALUATION OF HIGH AND EQUAL STATUS MALE AND FEMALE TOUCHERS

Debbie A. Storrs

Abstract

Henley's theory of touch and status was explored in a study where male or female subjects spoke to a male or female interviewer with equal or higher status who either touched or did not touch them. A number of interesting sex differences were isolated. Men ascribed significantly more negative adjectives to an equal versus high status interviewer who touched them. Status did not significantly moderate women's reactions to the interviewer's touch. Women were evaluated more favorably when they were identified as having high status. Ascribed status did not affect evaluations of men. Ratings of interviewer status were not influenced by interviewer touch. This finding contrasts with results from studies showing that higher status was ascribed by observers to people initiating touch in photographs and videotapes. It will be necessary in future research to determine the conditions under which touchers can achieve status in the eyes of people they touch.

Henley's work[1] has made an important contribution to the field of nonverbal behavior because it suggests that touch is not only an expression of warmth and nurturance,[2] but also a means of communicating status and dominance. Henley's theory of touch and status was based on observations of touch received and initiated by people with high (men, adults) and low (women, children) status.[3] Other researchers asked subjects to evaluate people in photographs and videotapes who were initiators or recipients of touch. More dominance was ascribed to those who initiated touch.[4] Leffler, Gillespie, and Conaty[5] approached the study of touch and status from the opposite direction by manipulating status. This was done by assigning male and female subjects in dyads to the role of teacher or student. Subjects with high diffuse status (men) and high assigned status (teachers) engaged in a greater number of intrusive behaviors, such as occupying space, pointing, and touching the student's possessions (person-to-person touch was not reported).

Studies demonstrating the effects of touch on perceived status have been limited to designs where subjects observed interactions between others. It is therefore difficult to integrate results from research on touch and status with studies in which subjects were actually touched.[6] It is reasonable to assume that observing others being touched is not equivalent to being touched yourself.

Debbie Storr's paper was written for Psychology 420, "Research Methods," Bruno Kappes and Chris Kleinke, Professors, UAA Psychology Department.

The present study was designed to gain a more comprehensive view of the interaction between touch and status by investigating all combinations of sex and manipulated touch and status in a two-person interaction. Male or female subjects spoke to a male or female interviewer with high or low status who either touched or did not touch them. Dependent variables included subjects' perceptions of the interviewer's status as well as judgments about his or her character. It was of interest to seek answers to the following questions:

1. Is touch accepted more when it comes from a high status versus equal status person?

2. Does assigned status have different effects on perceptions of men versus women?

3. Do men and women gain status in the eyes of same-sex or opposite-sex persons they touch in a benign interaction?

METHOD

Participants

Participants were 50 women and 43 men who were recruited as volunteers from psychology and sociology courses. Participants ranged in age from 17 to 47 years (M = 22.2 years, Md = 19 years).

Procedure and Experimental Design

Participants were informed they would be interviewed about their attitudes toward various issues and that when the interview was completed, they would evaluate the interviewer on a number of rating scales. The interviewer was a male or female confederate introduced as having equal or higher status. In half of the interviews, the interviewer did not touch the participant. In the remaining interviews, the interviewer touched the participant twice. Status and touch manipulations, combined with participant and interviewer sex, resulted in a 2(Participant Sex) x 2(Interviewer Sex) x 2(Touch vs. No Touch) x 2(Equal Status vs. High Status) factorial design. All interviews lasted six minutes.

Status

The equal status interviewer was introduced as a college sophomore psychology major. The high status interviewer was introduced as a psychology graduate student "with a lot of knowledge about the interview process." Equal status interviewers wore blue jeans, shirt/sweater, tennis shoes. The high status interviewer wore suitcoat/dress and semi-formal shoes.

Touch

In the touch condition, the interviewer touched the participant on the arm for 3-seconds at the beginning and end of the interview.

Dependent Variables

Manipulation check for status. Participants rated the interviewer's status on a scale from 1 (low) to 10 (high).

Personal Attribute Inventory (PAI). The PAI consists of 50 positive and 50 negative trait words.[7] Participants were asked to choose 30 words best describing the interviewer. A score was derived based on the number of negative words chosen.

Adjective rating form. Participants rated the interviewer on the following 18 adjectives arranged on a 10-point bipolar scale: attractive—unattractive, intelligent—unintelligent, modest—immodest, competent—incompetent, unselfish—selfish, honest—dishonest, submissive—domineering, ambitious—unambitious, inhibited—uninhibited, secure—insecure, appealing—unappealing, interesting—not interesting, friendly—unfriendly, polite—impolite, thoughtful—thoughtless, courteous—discourteous, outgoing—introverted, I liked him/her—I did not like him/her. Adjectives on the left were scored 10 and those on the right were scored 1. These adjectives have been found in previous research to discriminate between liked and disliked people.[8]

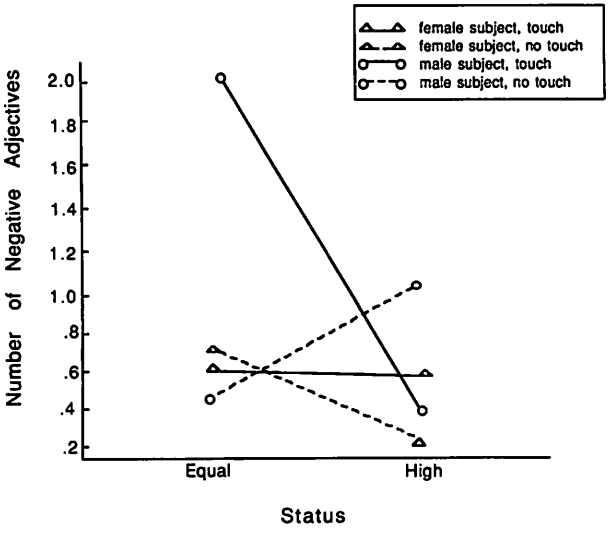
RESULTS

Data were analyzed with ANOVA using a 2(Subject Sex) x 2(Interviewer Sex) x 2(Touch vs. No Touch) x 2(High vs. Equal Status) factorial design. Only significant effects are reported.

Manipulation Check for Status

There was a marginally significant main effect on ratings of interviewer status showing that subjects rated the high status interviewer as having more status than the equal status interviewer (Ms = 7.06 vs. 6.33; $F(1,77) = 3.48$, $p < .06$). Ratings of interviewer status were not influenced by touch.

Figure 1



Subject Sex x Touch x Status interaction on the PAI

PAI

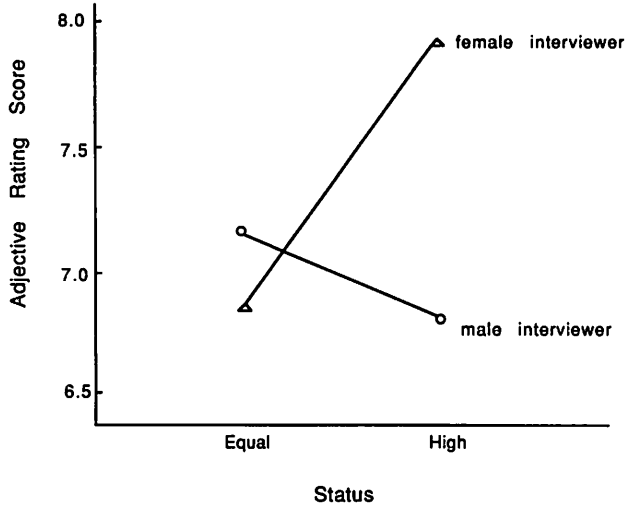
A significant interaction for Subject Sex x Touch x Status ($F(1,77) = 4.80$, $p < .03$) is displayed in Figure 1. Figure 1 indicates that status of the touching versus non-touching interviewer had a much greater effect on men than it had on women. Male participants were far more negative toward equal status interviewers who touched them ($F(1,77) = 4.58$, $p < .001$). For female participants, the status of the touching interviewer did not make a significant difference.

Adjective Ratings

Ratings on the 18 bi-polar adjective scale were factor analyzed with a principal components solution and varimax rotation. One factor was identified with eigenvalue = 6.53. For this reason, a mean score was computed for the adjective scale.

Analysis of the mean adjective rating score resulted in a significant Interviewer Sex x Status interaction ($F(1,77) = 5.82$, $p < .02$; see Figure 2) and a significant Interviewer Sex x Touch x Status interaction ($F(1,77) = 3.95$, $p < .05$; see Figure 3).

Figure 2



Interviewer Sex x Status interaction on the Adjectives Rating Scale

Data in Figure 2 indicates that female interviewers received particularly favorable evaluations when they were identified as having high status. The contrast comparing high status female interviewers with all other interviewers was ($F(1,77) = 5.60$, $p < .001$). Status level did not significantly influence evaluations of male interviewers.

Data in Figure 3 indicates that equal status touching female interviewers received significantly less favorable evaluations than high status touching female interviewers ($F(1,77) = 7.56$, $p < .001$). Status level did not significantly influence evaluations of touching versus non-touching male interviewers.

DISCUSSION

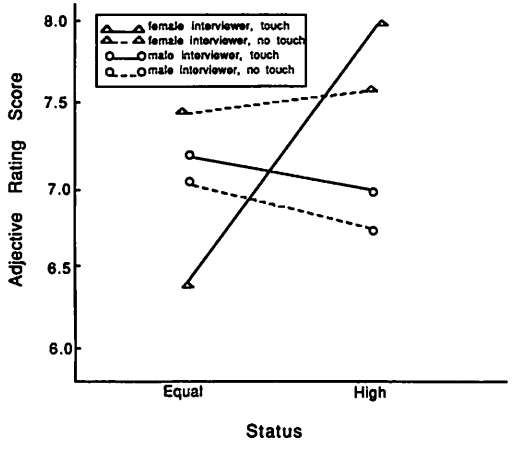
Because all combinations of sex, touch, and status were manipulated in this study,

it was possible to isolate a number of interesting sex differences. First of all, men were particular about the status of the interviewer who touched them. They ascribed significantly more negative adjectives to a touching interviewer who had equal versus high status. Status did not significantly moderate women's reactions to the interviewer's touch. This finding fits the general pattern of research showing that men are more reactive to touch than are women.[9]

A second sex difference was that evaluations of female interviewers were significantly enhanced when they were given high status. This result supports the notion that women have lower diffuse status in our society than do men.[10] Compared with male interviewers, whose diffuse status is already high, female interviewers were in a position to gain from the status manipulation in the present study. Equal status female interviewers received more negative evaluations than high status female interviewers when they engaged in touch. Touch from male interviewers was accepted regardless of their status.

It is noteworthy that ratings of interviewer status were not influenced by touch. This finding contrasts with results from studies showing that higher status was ascribed by observers to people initiating touch in photographs[11] and videotapes.[12] The touch manipulation was probably less salient in the present study because it occurred within the context of a conversation. It will be necessary in future research to determine the conditions under which touchers can achieve status in the eyes of people they touch.

Figure 3



Interviewer Sex x Touch x Status Interaction on the Adjectives Rating Scale

ENDNOTES

[1]Nancy M. Henley, "Status and Sex: Some Touching Observations." Bulletin of the Psychonomic Society 2 (1973): 91-93: Nancy M. Henley, Body Politics: Power, Sex, and Nonverbal Communication (Englewood Cliffs, NJ: Prentice-Hall 1977).

[2]Lawrence K. Frank, "Tactile Communication." Genetic Psychology Monographs 56 (1957): 209-255; M. F. A. Montagu, Touching: The Human Significance of the Skin (New York: Harper & Row, 1971).

[3]D. S. Stier and J. A. Hall, "Gender Differences in Touch: An Empirical and Theoretical Review." Psychological Bulletin 47 (1984): 440-459.

[4]C. Forden, "The Influence of Sex-Role Expectations on the Perceptions of Touch," Sex Roles 7 (1981): 889-894; B. Major and Richard Heslin, "Perceptions of Cross-Sex and Same-Sex Nonreciprocal Touch: It is Better to Give Than to Receive." Journal of Nonverbal Behavior 6 (1982): 148-162; D. L. Summerhayes and R. W. Suchner. "Power Implications of Touch in Male-Female Relationships." Sex Roles 4 (1978): 103-110.

[5]Ann Leffler, Dair L. Gillespie and Joseph C. Conaty. "The Effects of Status Differentiation on Nonverbal Behavior." Social Psychology Quarterly 45 (1982): 153-161.

[6]Frank J. Alagna, Sheryle Whitcher, Jeffrey Fisher and Edward Wicas, "Evaluative Reaction to Interpersonal Touch in a Counseling Interview." Journal of Counseling Psychology 26 (1979): 465-472; Jeffrey Fisher, Marvin Rytting and Richard Heslin, "Hands Touching Hands: Affective and Evaluative Effects of an Interpersonal Touch." Sociometry 39 (1976): 416-421; Chris L. Kleinke, "Compliance to Requests Made by Gazing and Touching Experiments in Field Settings." Journal of Experimental Social Psychology 13 (1977): 218-223; Colin Silverthorne, J. Micklewright, M. O'Donnell and R. Gibson, "Attribution of Personal Characteristics as a Function of the Degree of Touch on Initial Contact and Sex." Sex Roles 2 (1976): 185-193; Nan M. Sussman and Howard M. Rosenfeld, "Touch, Justification, and Sex: Influences on the Aversiveness of Spatial Violations." Journal of Social Psychology 106 (1978): 215-225; Sheryle J. Whitcher and Jeffrey D. Fisher, "Multidimensional Reaction to Therapeutic Touch in a Hospital Setting." Journal of Personality and Social Psychology 37 (1979): 87-96.

[7]Thomas S. Parish, W. Bryant and AnnMarie Shirazi. "Further Report on the Validation of the Personal Attribute Inventory." Perceptual and Motor Skills 42 (1976): 1257-1258; Thomas S. Parish, W. Bryant and AnnMarie Shirazi. "The Personal Attribute Inventory." Perceptual and Motor Skills 42 (1976): 715-720.

[8]Norman H. Anderson, "Likeableness Ratings of 555 Personality Trait Words." Journal of Personality and Social Psychology 9 (1968): 272-279; Albert J. Lott, Bernice E. Lott, Thomas Reed and Terry Crow. "Personality Trait Descriptions of Differentially Liked Persons." Journal of Personality and Social Psychology 16 (1971): 284-290.

[9]Stier & Hall, 440-459.

[10]Leffler, Gillespie & Conaty, 153-161.

[11]D. L. Summerhayes and R. W. Suchner, "Power Implications of Touch in Male-Female Relationships." Sex Roles 4 (1978) 103-110; B. Major and Richard Heslin, 148-162.

[12]C. Forden, 889, 894.

LAWRENCE HENRY GIPSON and the AMERICAN REVOLUTION

Mary Gilbert Howard

"A revolution is a change in human society so large that no one quite understands it, either at the time of its happening or subsequently,"[1] stated Edmund S. Morgan. The American Revolution can be seen in just such magnitude. Though the colonists "did not initially aim at independence, they did achieve it and in doing so became engulfed in other changes that also went beyond their intentions."[2] Historians, however, in their attempt to analyze and interpret the events leading up to the revolution have consistently tended "to reexamine the past in light of the prevailing ideas, assumptions, and problems of their own day,"[3] according to Gerald N. Grob and George Athan Billias.

It was Lawrence Henry Gipson's monumental work, *The British Empire Before the American Revolution*, and his interpretation of the revolution as an "aftermath of the Great War for Empire" (1754-1763), which provided historians with the means for a closer scrutiny of Colonial society. This scrutiny centered not only on the whole but also on specific institutions within that society during those troubled years which ultimately led to the break with the mother country.

The first generation historians, recorded John Braeman, in their effort to understand the American Revolution, "stressed the importance of the question of constitutional principle."[4] David Ramsey, who wrote in the year when the United States Constitution was adopted, "concentrated on the events which led up to the American Revolution and showed the unconstitutionality, inequity, and novelty of the series of measures taken by the British toward the colonies from 1763-1774."[5] Neither Ramsey or any other historian of his generation, however, was able to offer an explanation as to how these upstart colonists could have the audacity to go to war against the mother country.

During the period of Jacksonian Democracy, in which the public prided itself on its dedication to liberty and yearned for a glorious national past, George Bancroft interpreted the development of the colonies into a nation as "the unique experience of a particular people who from the beginning were aware of their destiny to shake off

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Mary Howard's paper was written for History 477, "Senior Seminar," Kenneth O'Reilly, Professor, UAA History Department.

the tyrannies of the Old World and to establish a nation dedicated to liberty."[6] The American colonists were governed by the most liberal government then existent, but Bancroft could not explain the source of those ideas of liberty.

During the period of rapid social and economic change in America at the beginning of the 20th Century, a new school of historians, the Progressives, drew upon the reform tradition that grew out of the effort to adjust American society to the demands of an urban centered and industrial age. Charles Beard, the most noted scholar of the Progressive school, sought to show in, *An Economic Interpretation of the Constitution*, that American history demonstrated the validity of class conflict and a social and economic revolution. This book, more than any other, defined American historical thought for many years as it concurred with the progressive thought of the day. For example, these reformers as one historian recently summarized their view, maintained that "society was open-ended and dynamic; its development was determined not by immutable laws, but by economics and social forces that grew out of the interaction between the individual and his environment."[7]

Coeval with the progressive view, and "at a time when a great diplomatic rapprochement between two nations, Britain and America, was in the course of being cemented,"[8] was the development of the Imperial school of historians led by Charles M. Andrews and George Louis Beer. "The most notable contribution of these historians" concluded Jack P. Greene, a Neo-Whig historian, "was a deeper understanding of the imperial side of American development."[9] The scholars of the Imperial school compiled an essential compendium of information concerning the British Empire and Colonialism; however, they were unable to distinguish what it was that caused the "sudden" breakdown in communication between England and her colonies which led them into open conflict.

The culminating product of this new approach to early American history, so far as the Revolutionary Period was concerned, was the monumental series by Lawrence Henry Gipson, *The British Empire Before the American Revolution*. It was through his scholarly research in writing this fifteen-volume series (published between 1936-1968) that Gipson came to view the American Revolution as "an aftermath of the Great War for Empire, 1754-1763."[10] According to Gipson, "not only the strains of the war that ended with the Treaty of Paris (1763) but the vast expansion of the Empire introduced highly complicated problems that could not be solved along traditional lines of British Colonial policy."[11] It was, then, the steps which the British government took to "meet some of the problems of imperial administration that loomed forebodingly in 1763, and the attempted solution of which created a fundamental issue between the mother country and the North American colonies." This controversy revolved around the nature of the British Constitution and the question of who had authority to determine definitely the fundamental principles upon which the constitution rested, and therefore the power to confirm or alter these principles.[12]

To understand the American Revolution as "an aftermath of the Great War for Empire" one must, for a moment, look more closely at the changes in British colonial policy after 1763. With the exception of a short period of time between 1660 and 1689 when the restored Stuart government tried to establish bureaucratic control in the colonies, the basic British policy toward her colonies had been one of "benign neglect"—not because The Crown did not care about what happened in the colonies but even more fundamentally than that: neither King nor Parliament paid for them. They had been

established through large scale joint-stock corporations and the only role the British government had actually played was to grant the charters. Therefore, England was more concerned with what was going on in England and the British Empire as a whole. Consequently, two separate histories began to develop, one in the colonies and one in England, which would eventually come into conflict.

The real impetus for this conflict came with the signing of the Treaty of Paris in 1763. According to Gipson, "that conflict left Britain heavily in debt and facing the extra burden of providing adequate security measures for North America." The tax burden which the colonies were asked to bear was far less than that of their compatriots across the Atlantic. The British colonial policies instituted after 1763 were designed to right that balance through closer regulation and enforcement of trade and the exacting of revenue from America. But these measures ran counter to the increasing political, cultural, and economic maturity of the colonies. Therefore, the conflict between parent and child appeared to arise out of a "fundamental constitutional defect—that the machinery for governmental control and maintenance of the Empire could not be easily adjusted to meet the changing needs demanded by the growing maturity of the older colonies."[13]

John Derry, in *English Politics and the American Revolution*, agreed that the conflict between Britain and its American colonies could "be understood only within the context of the received tradition of ideas and behavior that was so dominant within the British political consciousness." Both the response of the British politicians and the aspirations of the colonists were drawn from the same basic body of beliefs and experience. It was bequeathed to them by the Glorious Revolution of 1688 and suggested that "the British Constitution was perfect and unique, and that the frustrations and disappointments of politics must, therefore, be explained in terms of conspiracy against the Constitution." The depth to which this idea imbedded itself in men's consciousness could not be ignored. It was, then, this clash of deeply held convictions differently interpreted which became a paramount factor in the struggle.[14]

The implementation of the new imperial decisions made after 1763 brought with it the fear of a British conspiracy against the colonies which began to gather momentum. As Richard B. Morris has pointed out in *The American Revolution Reconsidered*, the years before the Revolution were years of extraordinary growth and maturity. The foundations for a "business elite," a "planter elite," and even a "political elite," were set, and the elites themselves enjoyed a considerable measure of self-rule. Demographic and economic growth went hand-in-hand with a sense of cultural difference from the mother country. A feeling of self-sufficiency was also fed by the results of the Seven Years' War, which eliminated the traditional French enemy from the North American continent in 1763.[15]

With the signing of the Treaty of Paris, England acquired an area of land eight times larger than its existing territory, necessitating a new policy for the governing of all new world colonies. The spate of Parliamentary legislation passed between 1763-1776, coupled with executive orders, began to erode American colonial perceptions concerning their individual status as Englishmen and the importance to Parliament of their institutions, especially their assemblies.[16]

The British Government viewed the establishment of the Proclamation Line of 1763 and the creation of a standing army as logical restrictions designed to diminish conflicts with the Indians and prevent Indian uprisings. The colonial perspective, however,

denounced it as arbitrary interference with their local governments, since it denied westward expansion into lands already granted by the colonial charters and challenged their ability to deal with uprisings themselves.

The passage of the Sugar Act (1764) and the Stamp Act (1765), stated George G. Suggs, Jr., also challenged "the century-long practice of colonial assemblies to tax their own residents and generally to govern their own domestic affairs." To colonists who had become used to thinking for themselves, continues Suggs, "these measures threatened the progressive and evolutionary development of nearly 150 years of self-government."[17] The Colonists, then, viewed the further passage of the Declaratory Act (1766), the Townshend Act (1767), and the Coercive Acts (1774) as still greater threats to the rights, privileges, and prerogatives traditionally associated with English citizenship; not only in theory, but also, in their perception of their own governments as equal to parliament.

Long before the battles of Lexington and Concord, perceptive Americans thought that they had discerned a pattern of tyranny in Parliament's ready resort to extraordinary means, including military force, to impose upon them its limited definition of rights, its self-serving definition of sovereignty, and its restrictive, unitary, concept of empire. The result was a widening ripple of dissatisfaction, suspicion, and mistrust concerning the motives of Britain that embraced a growing number of Americans on the eve of hostilities. Many concluded that a deliberate conspiracy against liberty was underway, a conspiracy which had to be resisted. Finally, the passage of the Quebec Act (1774) heightened Protestant-radical fears of Tory, Catholic-tinged despotism. The timing of the bill suggested an attack upon both Protestant and American liberties. The colonists perceived this to be not only a giving to the French of the rights for which they had been asking but also for which they were being punished.

The Declaration of Independence, therefore, must be seen as a part of the continuum—it was not a significant event in and of itself. The philosophy of the Declaration of Independence was revolutionary in that it did suggest a world turned upside down. The notion of self-determination—that governments are established to secure the rights of the governed and that all men are created equal—was not in the colonial charters, nor in Parliament. "In the final analysis," concluded Joel Barlow in *Advice to the Privileged Orders in the Several States of Europe* "it was the Americans' habit of thinking 'that all men are created equal in their rights' which had created their Revolution and sustained their freedom."[18] They were not under tyranny but they had persuaded themselves that they had "rights" and those "rights" were being taken away from them by a British conspiracy. This argument, therefore, justified their establishment of a new government.

"If subordination to London existed and was freely accepted in the middle of the 18th Century," as Gipson noted, it was not based on force nor was it capable of being based on force. It was, rather, "based on convenience and self-interest."[19] Thus, when the British government justifiably sought to exert stricter controls over the colonists at the close of the "Great War for Empire" in 1763, the Americans were slow to conceive of a new nation. It was only as they began to piece together the ideology of the radical Whig literature which had been circulating in the colonies since the 1730's that they began to perceive a British conspiracy in the extension of new British policies. They began to experience in their own lower house assemblies a notion of rights and equalities that called for resistance to "British tyranny."

Soon after the passage of the Stamp Act (1765), which was designed to collect revenue, the Sons of Liberty formed to fight for guaranteed rights of Englishmen as granted in their colonial charters. This brought about the repeal of the Stamp Act; but that act was shortly replaced by the Declaratory Act (1766), which asserted that Parliament had the right to legislate for the colonist in all matters. To Parliament this was not an unreasonable position. The colonists, as a part of the British mercantile system, were to supply raw materials and a market for British goods. In return, the colonists received a market for raw materials, a shipping industry, and the protection of the British Navy.

The colonists accustomed to thinking for themselves during nearly 150 years of self-government, saw in these acts a growing conspiracy. In addition, they had been reading pamphlets far to the left of the English political spectrum. Pamphlets which exerted that power corrupts and that opposition to power was legitimate. According to Bernard Bailyn, "it was primarily this opposition frame of mind through which the colonists saw the world and in terms of which they themselves became participants in politics."[20]

Thus, the Boston Massacre (1770) and the Boston Tea Party (1773) were challenges to this political authority, attempts to politicize "the colonies around a central focus of opposition to British policy."[21] Britain saw in these events, a growing American conspiracy, responding with the Coercive Acts (1774). (It is critical to remember that even though these new laws were quickly labeled Intolerable Acts, the colonists still did not seek independence from Britain.) When the Quebec Act (1774) was passed, essentially granting to the French the rights for which the colonists had been asking and receiving "punishment," the First Continental Congress met. According to R. C. Simmons, the delegates met not with the intention of forming a new government but only to stop any overt attacks on the old colonial charters. Not until the Second Continental Congress met in 1776 did they "finally resolve that the colonies might if they felt it necessary adopt governments that 'shall in the opinion of the representatives of the people best conduce to the happiness and safety of the constituents in particular and of America in general.' "[22]

The formation of state constitutions collaborated this growing political notion in that some of the common political principles of the age were to be found in their development. For example, all the constitutions rejected aristocracy as a hereditary order, imposed the severest limits on executive power, and contained a bill of rights. Most stated that power must be seen as flowing upward from consenting people, and some suggested that representation of the people must be apportioned.[23] Again, it is necessary to see the writing of the Declaration of Independence as a part of this continuum. The notion of self-government—that governments were established to secure the rights of the governed based on the consent of the governed and that all men were equal—had not been in their colonial charters, nor in parliament but in the writings of the Radical Whigs. "No analysis of the changes in the Declaration of Independence," states Jack P. Green:

> can fail to suggest that the preservation and consolidation of the rights and powers of the lower houses were central in the struggle with Britain from 1763 to 1776, just as they had been the most important issue in the political relationships between Britain and the colonies over the previous

century and a half. Between 1689 and 1763 the lower houses' contests with royal governors and imperial officials had brought them political maturity, a considerable measure of control over local affairs, capable leaders, and a rationale to support their pretensions to political power within the colonies and in the Empire. The British challenge after 1763 threatened to render their accomplishments meaningless and drove them to demand equal rights with Parliament and autonomy in local affairs and eventually to declare their independence. At issue was the whole political structure forged by the lower houses over the previous century. In this context the American Revolution becomes in form, if not in essence, a war for political survival, a conflict involving not only individual rights as traditionally emphasized by historians of the event but assembly rights as well.[24]

The colonists were governed by the most liberal government then in existence. They were not under tyranny; but, they had persuaded themselves that they had "rights" and these "rights" were being taken away from them. Therefore, they were justified in establishing a new government. This was characteristically different from other revolutions of the day in that the goals were conservative. They were not trying to get something new but to recapture what they perceived to have existed before. Thus, even on the very eve of revolution, many of the leading politicians still hoped for a reconciliation with England.

In the years since Lawrence Henry Gipson's monumental history appeared, historians have begun a more systematic and in-depth study of the Revolution. Modern historians have tended to look closely at details, a differential comparison of the colonies, and the various social, political, intellectual, and economical institutions in existence at the time. With this new approach, colonial history has diverged into broader fields of interest; and, stated Louis Wright, "as they have cast their nets wider, they have caught a greater variety of fish."[25]

Although diligent historians had for generations been investigating various aspects of life in their own localities, no one had taken on a comparative study of one locality to another. But about a generation ago, some writers began to see local history as part of a larger development, and began to relate what happened in one locality to other events in the colonies. Arthur M. Schlessinger, Sr. and Dixon Ryan Fox in their thirteen-volume series, *A History of American Life*, "demonstrated that the ordinary affairs of men in any period could be of consuming interest as well as of genuine historical significance."[26] It is in this type of writing that the mood or thought of the time can be discerned more readily and thus a better grasp as to how these thirteen independent colonies could suddenly work together to foment a revolution of such far-reaching consequences.

Bernard Bailyn in, *The Origins of American Politics*, has also been one of the new generation of historians to dig more deeply into the political and ideological issues of the day. In so doing, he found that the reading material of the populace in the colonies differed quite drastically from that of the English. The circulation of Radical Whig literature as early as, perhaps, the 1730's, was not enough, however, to justify a revolution in and of itself; but, coupled with the growing political experience of the colonists, it did provide an ideological framework that power corrupts and that government should

reside in the hands of the people. Therefore, when the British tried to implement new colonial policy after 1763, the colonists were prepared to meet them with resistance.[27]

Another one of the modern historians to add greatly to our understanding of the political conditions of the colonists in 1763 has been Jack Greene. In his essay on "The Role of the Lower Houses of Assembly in Eighteenth Century Politics," he has shown that not only did the lower house provide the colonists with a political experience; but also, in their struggle for political identity, they gradually came to redefine government itself. In other words, "they had no fear of innovations and welcomed the chance to experiment with new forms and ideas."[28] The chief fear of colonial legislatures was that of the imperial government. Much of this fear had derived from their experience and the reading of radical Whig literature. From 1763 onward, imperial actions appeared to challenge the position of the lower houses—threatening "to render their accomplishments meaningless and to drive them to demand equal rights with Parliament and autonomy in local affairs and eventually declare their independence."[29]

Each of these historians, through the closer scrutiny of the colonies, individually and jointly, and the examination of colonial institutions has added significantly to the understanding of the American Revolution. They have collaborated Lawrence Henry Gipson's establishment of it as "an aftermath of the Great War for Empire" by showing that it was a progression of ideas coupled with political experience which justified the break with England when new British policy was instituted at the conclusion of the war. The comparative study of one locality to another has shown that it was not an isolated happening but a growing notion of a British conspiracy throughout all the colonies which called for drastic steps to be taken to thwart unwanted and unwarranted tyranny on the part of Britain as perceived by the colonists.

Edmund Morgan suggests that "history does not yield all its secrets to anyone, and the Revolution remains at once the most significant and most elusive episode in our national history."[30] Lawrence Henry Gipson's most significant contribution, therefore, was to provide a catalyst for the gaining of new insights and understanding of the American Revolution. Modern historians have further examined it from this perspective, thus discovering forgotten events and trends. In this way, his work has eclipsed the economic interpretation which had so long dominated society.

In conclusion, it must be remembered that the American Colonists were governed by the most liberal government in existence on that day. In fact, contrary to what the economic historians would argue, they "had so prospered under the existing system that by the 1760's they felt strong enough to go it alone."[31] Only as their political experience melded with their ideology after 1763, can we see the emergence of a new nation "conceived in liberty and dedicated to the proposition that all men are created equal."

ENDNOTES

[1]Edmund S. Morgan, Ed., The American Revolution: Two Centuries of Interpretation (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1965), p. 1.

[2]Ibid.

[3]Gerald N. Grob and George Athan Billias, eds., Interpretations of American History: Patterns and Perspective (New York: Free Press, 1982), 2 Vols., p. 1.

[4]John Braeman, The Road to Independence (New York: Capricon Books, 1963), p. 1-2.

[5]Morgan, p. 2.

[6]Louis B. Wright, New Interpretaion of American Colonial History (Baltimore: Waverly Press, Inc., 1963), p. 1.

[7]Grob, p. 8.

[8]Richard B. Morris, The American Revolution Reconsidered (New York: Harper and Row, 1967), p. 25.

[9]Jack P. Greene, The Reinterpretation of the American Revolution 1763-1789 (New York: Harper and Row, 1968), p. 6.

[10]Morgan, p. 151.

[11]Lawrence Henry Gipson, The British Empire Before the American Revolution 15 Vols., (New York: Alfred A. Knoph, 1936-1968) 9: 7.

[12]Ibid., 10: 8-9.

[13]Braeman, p. 7.

[14]John Derry, English Politics and the American Revolution (New York: St. Martin's Press, 1976), pp. 204-205.

[15]Morris, p. 15.

[16]George G. Suggs, Jr., ed., Perspective On the American Revolution (Carbondale: Southern Illinois University Press, 1977), p. 2.

[17]Ibid., p. 2.

[18]Gordon S. Wood, The Creation of the American Republic 1776-1787 (New York: W.W. Norton and Company, 1969), p. vii.

[19]Gipson, Vol. 5, p. viii.

[20]Bernard Bailyn, The Origins of American Politics (New York: Random House, 1968), p. 57.

[21]Suggs, p. 66.

[22]R. C. Simmons, The American Colonies (New York: W.W. Norton and Co., 1976), p. 360.

[23]Ibid., p. 361.

[24]Jack P. Greene, "The Role of the Lower Houses of Assembly in Eighteenth-Century Politics," James Kirby Martin, ed., Interpreting Colonial America (New York, 1978), p. 327.

[25]Wright, p. 3.

[26]Ibid., p. 4

[27]Bailyn, pp. 159-160.

[28]Greene, Lower Houses, p. 320.

[29]Ibid., pp. 325-327.

[30]Morgan, p. 4.

[31]Braeman, p. 5.

THE CARRIAGE TRAP

Joann Congdon

Marly huddled in the corner pretending not to hear.

The woman called Joyce said, "Marly, you've been sitting there for two hours. Honey, I know you miss your family. But upstairs is a bedroom just for you. Wouldn't you like to see it?"

Marly's closed eyes fluttered. Why should I want to see some dumb old bedroom without Krissy? Marly thought. Krissy's prettier than you.

"We could find clothes for this doll, upstairs. You want to come look?"

Marly kicked the doll away. She squeezed shut her eyes and pictured Krissy.

"What am I doing wrong?" The Joyce woman made little laugh noises. "Would you like some hot cocoa? You're shivering. I'll go make cocoa."

Marly squinted between her fingers as the woman left. Then she stood up and walked silently, the way her brother Jimmy had taught her when they needed food. She darted across the living room and up the stairs. The first bedroom looked like the grown-ups', but the next one had two beds plus her suitcase in it. Marly crept on down the hall and found a bathroom. She needed it, but had to learn the lay out of the house, first. Marly stopped outside of the room at the end. She peeked in and saw a toddler sleeping in a crib, and an open closet door. Marly slipped into the closet and found a little window that looked out onto a roof. The window had a simple latch. Her brother would like that: a way out. She pulled the closet door almost shut, and squatted down behind a box of diapers.

Let them look for her. It would take more than cocoa to make her talk to them. The caseworker had lied. Marly clenched her fists remembering the caseworker saying, "Of course, you and Krissy can be together in a foster home." So Marly had let go of her big sister's leg and allowed them to take her away. Marly jammed her fists against her eyes, fighting the tears. Jimmy told me not to believe them. I'll make these people give me back to the caseworker, and I'll find Krissy.

She saw a folded quilt in the corner, like the one her mom covered the big bed with. Krissy hadn't let Marly or her brother use it so that the quilt would be just the way their mom liked it, when their mom returned. Marly crawled in between the folds,

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slid her thumb into her mouth, and imagined Krissy. She tried to remember one of the stories Krissy told her at bedtime, before the police found them living alone in their apartment. Marly's throat ached. She shuddered but did not cry.

Marly thought hard about her favorite story, the one with the magic carriage that their mother would send to fly them away to be with her. Krissy had said their mother's carriage was gold, pulled by silver horses with huge wings. Marly saw the horses flying towards her, and felt the strong wings lifting her up. Her cheek pressed against the soft warmth of their feathers. They felt smooth, like Krissy's flannel shirt. She reached out to Krissy.

"Marly? It's okay. Marly, I'm just taking you into the bathroom. I think you've had an accident. We've gotta' clean you up."

Marly kept her eyes shut after the woman who would never be her foster mother set her down. She heard the water running. The Joyce woman was talking again. "I guess I'll have to rubber sheet your bed."

It's not my bed, Marly thought. She smelled something that made her nose twitch. When she felt cold fingers pull down her wet underpants, she screamed and swung out her arms, smacking them against the Joyce woman.

"Ow—Marly!" the Joyce woman said crossly, grabbing Marly's hands. Marly opened her eyes and saw a red mark on the side of the Joyce woman's face. "I'm just going to bathe you. You need a bath," the Joyce woman said, squeezing Marly's wrist. "No one's hurting you."

The Joyce woman let go of Marly's wrists. Marly hid them behind her and rubbed them while the Joyce woman carefully pulled off the rest of Marly's clothes, leaning well back from her. Marly glanced over at the tub. It was full of suds like when Krissy did the dishes. She must think I'm filthy to use that much soap, Marly thought.

Marly saw a green plastic turtle and a little red boat sitting on the edge of the tub. Jimmy could lift me better toys than that, she thought.

The Joyce woman said, "Okay, here we go." Marly stiffened. The Joyce woman picked her up and set her in the tub. The bubbles tickled as she sank down through them into the warm water. They made a soft noise, like the sound of Krissy brushing her hair in the next room. Krissy's hair was yellow, like dandelions, and curled, not rusty like this woman's.

"Now, how's that? Do you like bubbles?" The Joyce woman reached towards Marly with a washcloth. Marly curled up, her face in her knees, her hands wrapped around her head.

"Marly, what am I going to do with you? This is just a bath. Don't you understand?" The toddler in the bedroom cried. "Look, I'll set the washcloth here, and if you bathe yourself, fine. If not, I'll have to bathe you. And these toys are here for you. I'll let you play for a few minutes, okay?"

Marly ignored her.

After the Joyce woman left, Marly lifted her hands through the bubbles, and watched a few break off and float up until they popped. She did not touch the toys. She wasn't about to let that old Joyce woman think she intended to stay there.

Marly picked up the washcloth. Krissy would love it. It was thick, and blue, the color of Krissy's eyes. She'd save it to give to Krissy.

Marly did not want any ugly Joyce woman touching her again, so she washed herself. She wasn't a baby. When she was done, she dried off and dressed in clothes

sitting by the heater. Then she carefully wrung out the washcloth, hid it under her armpit the way her brother had taught her, and slipped down the hall to the room where she'd seen her suitcase.

At first she couldn't find the suitcase, and thought they'd stolen it. Then she saw the handle under the bed. She pulled it out and opened it. Empty. She pushed the washcloth into the corner and shut the suitcase. Where had they hidden her clothes? Krissy hid money under her mattress.

Marly crept into the big bedroom and lifted the spread. She shoved her hands between the mattresses. They were too heavy. She stood up and cased the room as her brother had taught her, noticing every place to hide in or escape from. There were three windows, with so many green curtains it would waste time trying to open them. The closet door was the only other door. She peeked in. No window. Jimmy would call a room like this a trap. He told her to never go in anyplace that didn't have more than one way to get out. But she needed her stuff. She walked over to the dresser, then stepped back when she saw herself in the mirror. I look scared, she thought. She pushed her bangs out of her eyes. "Never look scared," Jimmy said, "Look tough." She watched her reflection change to tough, real tough.

That was when she saw the carriage. It was reflected in the mirror. The carriage was golden, pulled by a white horse. The small figurine sat on a cloth in the middle of the dresser. Sunlight glinted off of its shiny surfaces. She picked up the horse and carriage, then snuck back into the room with her suitcase. Marly carefully wrapped the washcloth around it, placed it in the suitcase, and slid the suitcase as far under the bed as possible. Wait 'til Krissy saw that!

"Good for you, you're all dressed," the Joyce woman said from the doorway. Marly froze where she knelt by the bed. How much had she seen?

"I want you to meet Sammy."

Marly turned. Clinging to his mother's jeans stood the baby Marly had seen in the crib. He sucked his thumb and stared at her. She stared back with her tough look. He sucked faster.

"I've been telling him about his cute new sister.

"Marly, I unpacked your clothes and put them here in the drawer. And did you find the doll clothes on your shelf? Do you like to play with dolls?" Marly tried to gauge the distance between the Joyce woman and the door frame. She pretty much filled the doorway. "Would you tell me what you would like to do? Would you like to help me fix supper? I could sure use your help." The Joyce woman stretched out her hand.

She must have seen, Marly thought, and ducked.

"Marly, honey, I'm not going to hurt you. We want you to like it here. We asked for a little girl." She looked down at Sammy, unhooked his arms from her leg and picked him up. Then she faced Marly again. "If you'd just tell me what you want—."

Marly turned her head and scanned the windows. Why would anyone put so much cloth over a window? In here the curtains were yellow. Some began halfway across the windows and hung straight down, while the rest began at the top and were swerved over to the sides and tied with ribbons. At home, Krissy had taken the curtains down when it got cold, and had wrapped her up in them at night. If this old Joyce woman wanted a girl so much, why didn't she want two? Why couldn't Krissy be here? There were two beds. "Hey, Sesame Street's on, now. You could watch it with Sammy, okay?" The

Joyce woman carried Sammy downstairs. Marly followed. Maybe if she hurt Sammy they'd give her back to the caseworker.

Marly watched the Joyce woman set him down in a playpen and turn on the TV. Marly waited until she faced them, then leaned into the playpen and slapped Sammy hard on the back of the head.

"Marly—," the Joyce woman cried, and scooped Sammy up. He took in a long breath, so long that Marly wondered where he put all the air. Then he shrieked.

The Joyce woman hurried into the kitchen with him.

Marly dashed back upstairs, pulled out her suitcase and threw in her things from the dresser drawer. There wasn't much to pack. She took the time to wrap her nightie, an old shirt of Krissy's, carefully around the washcloth and carriage. She shut the lid, and snapped the latches shut. Marly lifted the suitcase and dragged it to the stairs. It wasn't heavy, but she didn't want to bump the carriage so she slid it, one stair at a time, down into the entry.

Sammy had stopped crying. The Joyce woman was saying something to him. Marly heard, "She went too far," and "making sure that that won't happen again." Good. Maybe the caseworker would take her back, now.

"Marly!" the Joyce woman called. She sounded angry. The TV was droning, "This show is brought to you by the letters T and K, and the number 7."

That's my number, thought Marly, I'm seven.

"There you are." The Joyce woman set Sammy in the playpen and marched into the entry. "Young lady, we're going to get a few things straight. You live here, now. Packing your bag and hitting Sammy won't change that."

Marly glanced around. The stairs, the front door, and the opening to the living room were the only ways out of the entry.

"But you are NOT to hit Sammy. Is that clear? Now give me that suitcase, then you're restricted to your room. Do you understand?"

Marly lunged for the door. The Joyce woman grabbed her arm with one hand, and the suitcase handle with the other.

"Let go, Marly, just let GO."

Marly grasped the doorknob and turned. The shiney metal slipped around inside her hand. She felt the Joyce woman prying her fingers off of the suitcase. Marly yanked fiercely on the handle while the Joyce woman did the same. The old latches gave way and the lid fell open. Marly watched in horror as the washcloth and carriage unrolled from the shirt and fell down onto the tile floor with a clink.

"Marly—," the Joyce woman began as she bent to look. "My carriage!" Her voice squealed up on the last word like the sound of tires outside of their apartment late at night. The Joyce woman picked up the figurine. The piece connecting the horse to the carriage had snapped. Marly saw her big spotted hands tremble, and couldn't tell if she were going to yell or cry.

Marly grabbed the doorknob with both hands and forced it open. No way was she going to be trapped in there with that woman. She raced out into the street, looking for cover. All the yards were fenced. She wasn't about to be trapped again. Up the road she saw a bridge, and a gap between it and the nearest railing. The Joyce woman was shouting her name. She sounded close. Marly tore through the gap, skidded down a bank, then slipped in the mud. She rolled into the weeds lining the creek and saw the Joyce woman sliding down the mud on her bottom. Before Marly could scramble away,

the Joyce woman gripped her around the waist. Marly kicked and flailed as hard as she could. "Hold still! I'm not-going-to hurt-you-hold-still!"

Marly screamed. Joyce woman wrestled with her, wrapping her arms around Marly until she had pinned Marly's forearms with one hand, and her legs with the other. She dragged Marly up onto her hip. "You—are—coming—home—with—me—is—that—clear?" Marly jerked and bucked the way she'd seen Jimmy do when the police took them out of the apartment. The Joyce woman hoisted her back through the tall grass of the incline. Marly tried to bite, but the Joyce woman held her face out of reach. Marly felt each stomp of the Joyce woman's feet as she hauled her along the sidewalk, up the steps, and into the house. The carriage lay on the tile floor in two pieces. Marly watched it through the stair railing as the Joyce woman carried her upstairs and into the bathroom.

Then the Joyce woman made a short sound that wasn't a cough or a hiccup. "Look at us," she panted. "Look in the mirror. We look like a couple of mud wrestlers."

Marly twisted around and saw their reflection. She saw she was shaking. They were both splattered and smeared with dirt. Grass stuck out of Marly's hair and the Joyce woman's collar.

"You are something else," the Joyce woman said between deep breaths. "Did you take lessons from an alley cat?" Marly rolled her lips in. "Okay, but I know you can talk." The Joyce woman kicked the door shut, pushed in the lock with her elbow, and shoved the laundry hamper in front of the door with her foot. Then she set Marly down. Marly was trapped. Jimmy would be ashamed of her.

Marly held very still. Jimmy said to watch for the direction the blow came from, and move with it.

The Joyce woman squatted down to Marly's level, and said, "I'm going to clean you up, and you are going to stay in your room until supper. And then we are going to eat dinner. And if you try to run away again, I'll bring you back again, and again, and again. For the time being, this is your home, and. . . ."

Marly kept waiting to hear what the Joyce woman was going to do to her for breaking the carriage. If the woman hadn't grabbed the suitcase, it wouldn't have broken. Now Krissy would never see it. Marly crammed her knuckles into her mouth, fighting the tears.

The Joyce woman dropped the washcloth and hugged her. Marly's face pressed into the mud on the woman's shirt. The Joyce woman said "Oh, honey, don't cry, it's okay. Oh dear, now I got more mud on you. We've got to get cleaned up."

Marly clamped her teeth together while the Joyce woman wiped the dirt off of her. She'd really blown it. But she'd still get back to Krissy. She'd hit Sammy every chance she got. She'd throw food on the floor, she'd—.

"Okay," the Joyce woman said, tossing the washcloth into the tub, "To your room, young lady." She led Marly to the room with yellow curtains. She let go of Marly's hand, and shut the door. Marly ran to the windows, pushed away the curtains and looked out. It was straight down two stories to the driveway, with nothing to climb on. She yanked open the closet. Nothing. No windows. She crossed to the bedroom door. Slowly she opened it. The Joyce woman was sitting in the hallway folding laundry.

"Marly, you really do have to stay in your room until supper."

Marly slammed the door. Then she walked to the windows. She unhooked the lower curtain rod, and slid the curtains off of it. She carried them back to the bed, crawled

under it, and wrapped up in the curtains the color of Krissy's hair. Marly slid her thumb into her mouth, and shut her eyes.

Later, she opened her eyes and wiped saliva off of her chin. She smelled meat cooking. She unwrapped the curtains and rolled out from under the bed. The bedroom door was open. She crept downstairs to the entry. The figurine was gone. She stood by the stairs and sniffed the smell of the meat. Her tummy churned.

"There you are, right on time." The Joyce woman walked towards her from the kitchen. "But the tacos aren't quite done, yet. We have time to tackle the horse and carriage, okay?"

Marly squinted her eyes and kept her knees bent. This Joyce woman was tricky.

Sammy stood by the TV with his thumb in his mouth. He stepped back a step when he saw Marly.

Marly was poised to run, when the Joyce woman said, "Marly, you're like me."

Marly looked up at her. How could she be like this tall, lumpy woman with the long orange ponytail?

"We both like figurines. I wanted that one from the moment I saw it on my grandma's dresser. You have good taste.

"Let's see if we can glue it. Come on into the kitchen." Marly let the Joyce woman take her hand and lead her through the house to the table. "Hmmm, we'll need toothpicks, and something to prop it up on." The Joyce woman pulled a small measuring cup out of a drawer, and sat down at the table with the glue. Marly watched as the Joyce woman carefully worked with the pieces until they fitted together just right, propped on the overturned cup. "There. We'll leave it right here by the salt and pepper to dry. It'll have to sit overnight, but by tomorrow it should be fine. Now, do you like tacos?"

Marly remained silent, but sat down at the table, keeping her eyes on the carriage. It glistened in the overhead light. She picked up a taco, and bit into the meat. Marly ate two tacos. She didn't want the Joyce woman to give her back to the caseworker until the carriage was dry. She planned to wait and take it to Krissy tomorrow.

The Joyce woman talked about what a good eater she was, and how happy someone named Wes would be when he got back from somewhere and saw his little girl. Marly planned to be gone before there were two of them to chase her.

Marly let the Joyce woman put her to bed after dinner. The Joyce woman looked at the empty curtain rod before opening a story book, sighed, and said, "Tomorrow you can help me put the curtains back up." Marly scanned the pictures in the book the Joyce woman read, but quickly turned her head away whenever she glanced at her.

After the Joyce woman left, Marly pulled the curtains out from under the bed, wrapped up in them and lay down on top of the bedspread. But the curtains didn't keep her warm. After awhile, Marly pulled the curtains with her under the covers.

In the morning Marly's eyes flew open. She sprang out of bed thinking, where am I? Her heart pounded in her ears like the beat from the neighbors' boom box. Then she saw all the curtains. She clapped her hands over her mouth to keep from screaming, and slowly remembered yesterday, and her plan. She ran downstairs, and into the kitchen. Marly plunked both hands on the table beside the salt and pepper. The carriage was gone. The Joyce woman must have guessed her plan.

"Good morning, Marly. How are you?" The Joyce woman was feeding Sammy in a highchair. She turned towards Marly, and sort of squinched her face together, then asked, "Didn't you see it upstairs?"

Marly shook her head and ran back up and into the Joyce woman's bedroom. The carriage was not on her dresser. She heard the Joyce woman walking up the stairs.

"Look in your room. I wanted it to be the first thing you saw when you woke up."

Marly ran into the room where she'd slept. There on that dresser sat the carriage. She stared at it. She could hardly see the crack. It was just a tiny thin line. Like one of Krissy's hairs.

The Joyce woman knelt down beside her and put an arm around Marly's shoulders. "It's beautiful, isn't it? But the carriage is fragile. If you try to take it somewhere, it will break again."

Marly turned and looked into the Joyce woman's eyes. They were not as big as Krissy's. She's lying, Marly thought. She smelled bacon. Krissy would know how to take the carriage without breaking it. Krissy's smart. Krissy's smart enough to find me. I'll wait for Krissy.

Showcase Award Ceremony

FEASIBILITY OF METHOD: AUTOMATED CODE TRANSLATION USING FORMAL LANGUAGE DEFININTION

Stephan F. Stevens

THESIS STATEMENT

The successful development of a mini-meta-language indicates problem oriented computer languages can be formally defined using a single standardized meta-language.

INTRODUCTION

LANGUAGE TRANSITION

Natural language is the means by which humans communicate ideas. Unfortunately, all humans do not speak (or write) the same language. This gives rise to the natural language translator. This translator, is a person fluent in two or more languages who will change an idea from one language into another. The translation process is often accomplished orally but this limits the number of people receiving the communication. The most economic means of transmitting an idea is by written communication. The idea can then be reproduced and distributed at low cost and across a wider time frame (you don't have to be there when the book was written). But, the translation of written text has long been a tediously manual task (even with dictionaries available). This causes a barrier to the flow of ideas from one culture to another.

Computer scientists have attempted to economize the process by automation (i.e. computers) but success has been limited. Human language is very dynamic because humans adapt to their environment very quickly by creating a new word and/or changing a word's definition. These changes can often be of a temporary or specific nature. Further, human language is supplemented by other information, such as pictures and common experience.

On the other hand, computer languages have a much more restricted domain. They are not as dynamic as natural language and no supplemental information is used. Hence, finding an automatic method for translating computer languages should be a more achievable goal. However, the translation of computer language is not without problems.

COMPUTER LANGUAGE TRANSLATION

The formal definition of a computer language is necessary for its commercial proliferation. Without formal definition, compiler publishers develop their own dialects causing software to be nontransportable between compilers. This ultimately raises the cost of (creates a barrier to) software development. The compiler user is now dependent on the publisher and the computer manufacturer (sometimes the same) for further

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support. If either of the two companies fail then the user must undergo an expensive migration effort to a new compiler and possibly a new language. To formally define a language doesn't necessarily insure that the problem will be solved, only limited. The reason is enhancements; compiler writers are free to add extra features and still say the compiler conforms to the standard.

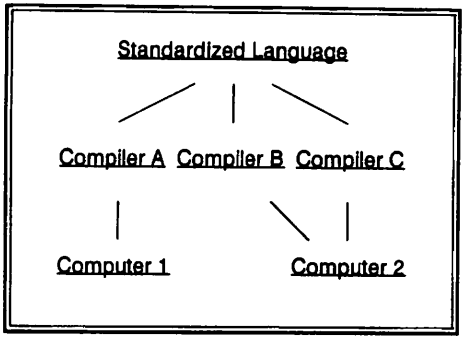


Figure 1. Language Implementation

The automation of computer code translation from one language, or dialect, to another can free the user of the above problems and reduce migration cost. Automation is possible but contingent on the ability to completely and concisely define both a language and its dialects. Without a definition, the automating program will be limited to translating from one specific compiler to another. The process can be economized by generalizing the translation process and this requires a standard method of formal definition.

LANGUAGE COMPONENTS

Natural languages often use two methods, both are widely used in dictionaries, to define a word. The first method uses an alphabetical listing indicating proper *syntax* (spelling), a classification system of word types (nouns, adjectives, etc. . .) indicating its use in *context*, other more commonly understood words to describe the *semantic* meaning, and a phonetic breakdown for proper pronunciation. Additionally, some dictionaries use root words, historical development, and examples to help describe the proper spelling, use, and meaning. The second method is used when words fail to describe one of the above components; pictures. Thus we have the three elements of language definition; syntax, context sensitivity, and semantic meaning. The pictures are used when words cannot be found to infer meaning or to clarify. Thus the pictures are semantically primitive to the written word. Historically, primitive cave drawings predate human written history.

Each of these natural language components are also present in computer languages. If we were going to define a computer language to humans then pictures may still provide a semantically primitive means of communicating meaning; but, pictures cannot be used to describe meaning to a computer (they don't have eyes—yet). The use of a meta-language, to describe each of the computer language components, can solve the problem of formal definition (so long as the meta-language is semantically primitive).

FORMAL COMPUTER LANGUAGE DEFINITION

HISTORY

Early in the history of the digital computer, there was only machine language. Each computer had its own binary language which was used to encode program instructions from users. Users found binary awkward to work with so assembler language was born. Assembler language substituted a symbol for each binary instruction and used a compiler to convert the symbols into binary.[1] Since every computer had its own version of binary, every computer also had its own machine language compiler.

Then some users came up with the idea of creating more powerful languages. They developed languages (like Fortran) which substituted several binary instructions for each new symbol. These symbols were more English-like than their predecessors. Compilers were written to convert the new languages into binary for the computers. Theoretically, a program in one of the new languages could have a compiler on different computer models and the computer would perform in the same fashion. This was accomplished by translating the new language source code into the specific machine language for that computer model. Some of these new languages became "standardized" by committees to make them independent of specific computer models.

People in the computer industry suddenly found themselves with the task of defining a language. Since they hadn't done this before, they tried using the standard natural language dictionary format of definition. Problems quickly surfaced with unclear or ambiguous definitions. To help alleviate this problem, a simple method of defining syntax was developed.

SYNTAX

The most simple yet important aspect of any language definition is its syntax because we are defining patterns of the symbols being used. At this point we do not care about what they mean or when it is appropriate to use them, only structure is being considered. For example, spaces are used to separate the words of this sentence. We don't assign a meaning to the space it is merely used to indicate the structure of the sentence. Withoutspaces,thissentenceisdifficulttoread. The same is true of computer languages. A clear definition of a computer language's syntax is important for without it the compilers would not work.

SYMBOL	MEANING
:: =	pattern assignment
|	or (alternate pattern)
< >	surround category names
[ ]	optional components

Figure 2. BNF Symbol Definition

Backus-Naur Form

The most common method for defining syntax was developed by John Backus in 1959 and was improved upon by Peter Naur shortly afterward. The Backus-Naur Form (BNF) uses very few symbols to define syntax and structure but is powerful due to its recursive nature. The symbols are summarized in Figure 2.

Category names are English-like words which are associated with specific patterns by the assignment symbol. Patterns contain some combination of category names and/or literal constants. Category names can have alternate meanings with the use of the "or" symbol. Figure 3 provides a brief example of how BNF symbols could be used to define structure and syntax.

```
<program>   ::=   program
                      <declaration-sequence>
                  begin
                      <statement-sequence>
                  end.
```

Figure 3. Example of BNF

BNF Enhancements

The original BNF was good but tedious to use and limited. Additional enhancements allowed optional components to be defined within a pattern and allowed category names to reference themselves. The ability of category names to reference themselves is called recursion and is a very powerful feature of BNF. Figure 4 shows how the enhancements can be utilized.

```
<if-statement>      ::=   if <comparision> then
                              <statement-block>
                          [ else
                              <statement-block> ]
                          endif
<integer>           ::=   <digit> | <integer> <digit>
<digit>             ::=   1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0
```

Figure 4. Example of BNF Enhancements

ENVIRONMENT

I have previously mentioned context sensitivty as the next component of language definition but there are problems specific to computers which cause me to reclassify context sensitivity as environment. This was hinted at in Figure 1. Languages are implemented by different compilers on different computers. These compilers do more than just convert code into binary, they provide a productive environment for the programmer.

Programmer Aids

Compilers often have directives which are not part of the language but do affect transportability. Directives may include code from a separate file, or automatically create code from a predefined pattern called a macro. These features are increasingly becoming standard in modern compilers.

Computer Architecture

More important than compiler directives is the computer architecture itself. Some computers are based on 16 binary digits (bits) while others use 32 or 64. This limits the size of numbers which the language can support. Some computers are scalar processors (one processor) while others are of a parallel design (two or more processors). Each of these details can affect program performance but they are not included in language definition. They are implementation dependent.

Limitations

This is an opportune time to more clearly discuss the domain of this report. Since it concerns feasibility, I will target the mainstream computer industry and limit discussion to: problem oriented languages (like FORTRAN, COBOL, Pascal...) and compilers without directives. This will help keep the report from becoming a book.

Classical Context Sensitivity

The usual examples of context sensitivity concerns the use of labels. These are names for things like storage locations (variables), block entry points (sub-programs), and control transfer. Labels provide the programmer with a means to identify program elements/positions with a name which infers its purpose. It is important to note that labels are used to infer data and control structures. Normally, data structures are declared within control structures which are declared within other control structures. The box within a box effect.

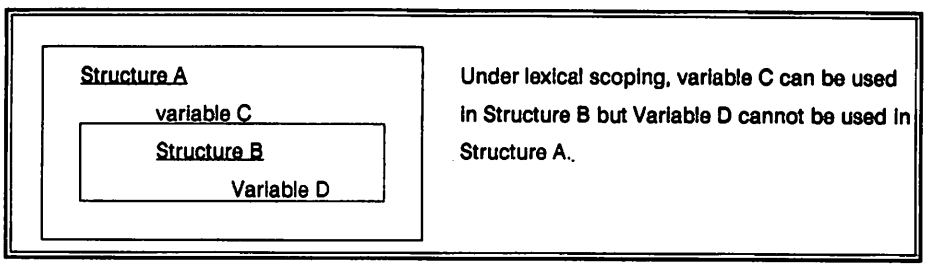


Figure 5. Example of Lexical Scoping

Lexical Scope

Modern programming languages allow structures, with associated labels, to be declared valid for only part of a program. The part of a program over which a label is considered valid is its scope. Problem oriented programming languages typically use lexical scoping which can be described by these two rules:

The scope of a declaration includes the structure in which it occurs but excludes any structure surrounding it.

The scope of a declaration includes any structure contained within the structure in which the declaration occurs but excludes any contained structure in which the same label name is redeclared.

Figure 5 indicates how control structures and data declarations interact with lexical scoping rules.[2]

Definition

Typically, a syntax definition is extended to include attributes of the language being defined. Things like lexical scoping are considered attributes of the language and are described with functional operators. For example, to make sure that a label hasn't already been used we can use the function EXIST(**name**). This function will return true if **name** has already been defined in the environment according to the lexical scoping rules. If it has, an error will be indicated or else **name** will be asserted into the environment as a valid label.

Unfortunately, while there has been a method developed for defining syntax (BNF), there hasn't been a method developed to indicate environment. A full library of functions, such as the above example with EXIST, will need to be developed.

SEMANTICS

The behavior of a program is usually inferred through descriptive labels and the use of keywords or operators. But when given the code: C = 5.0 / 2.0, it's easy for a human to misinterpret the meaning. If C has been declared to be an integer, what type of result should be stored in it. Should a calculated result of 2.5 be truncated to 2 or rounded to 3? This subject is referred to as semantics and has caused many problems in language definition.

History

Typically, formal language definitions have relied on a BNF format with enhancements to infer environmental rules and English description of the semantics. The one exception was made by a team of IBM scientists in Vienna when they defined PL/I. The language was described in terms of how a valid program changed the state of an abstract computer, in other words, how it behaved. This method became known as the Vienna Definition Language (VDL).

Abstract Computer

In order for the VDL method to work, they first had to define an abstract computer. Then functions which would change the state of the computer needed to be defined. Unfortunately, this method was seen as too complex for widespread acceptance and was abandoned in favor of an enhanced BNF definition of PL/I.

The concept of an abstract computer is still useful. If we stick to the mainstream computer industry, as above, we can limit the scope of this report to computers that are stack oriented and scalar (single processor).

This report's findings could later be extrapolated to include all known cases (parallel computers, etc.).

The abstract computer is defined to have: an accumulator, for temporary storage; a program status register, containing flags to indicate processor condition; and a stack for saving the environment before entering a subprocedure.

Keywords vs. Operators

In all of the problem-oriented computer languages there are keywords which help to define program structure and operators which help to define semantics. Keywords are used as strictly punctuation but operators are also used to define behavior. The abstract computer, defined above, has a limited set of operations which it can perform; therefore, we should be able to define a language's operators if we can equate them with the abstract computer's operations. This relationship may be one-to-one or one-to-many. Alternatively, the operator can be viewed as an abbreviated name for a commonly used function or subprogram.

Primitives

The abstract computer operations must be semantically primitive to what they are describing (just as in an English-language formal definition). Computers are capable of several types of operation. For example, logical operations allow binary digits to be manipulated using standard logic. Figure 6 shows some of these operations in the form of truth tables. Another example is arithmetic operations like addition and subtraction.[3]

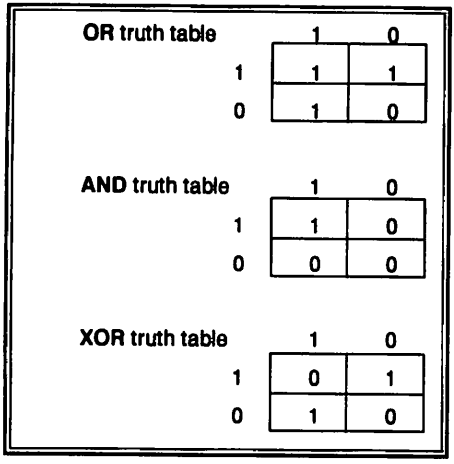


Figure 6. Logical Truth Tables

I have examined assembler languages for the IBM PC, DEC PDP-11, and DEC VAX-11 computers for the purpose of finding universally used operations. Since assembler language is semantically primitive to problem-oriented languages, I was able to compile a list of primitives into a semantic dictionary (refer to Appendix A). This dictionary now allows me to describe any operation possible for problem-oriented languages implemented on stack-oriented scalar computers.

ABLE META-LANGUAGE

The purpose of this report is to document the design of a mini-meta-language for formally defining problem-oriented computer languages. To date, the major reason for computer language formal definition has been standardization of compilers. This required the definition to be implementation independent so one computer manufacturer/compiler/publisher would not have an unfair advantage over others. A more pragmatic reason for formally describing computer languages would be the automatic conversion of computer code from one language/compiler/computer to another. Because of this, a method of accounting for the size of data fields (in bits) is included.

OBJECT ORIENTATION

The English language is made up of objects called words, sentences, paragraphs, etc. Rules exist for modifying these structures into other forms. For example, the plural form of "Language" is "Languages." The rule for changing a word into its plural form is well known and only works on words (you cannot simply change a paragraph into plural form). Other transformations, such as changing the tense from present to past are also well known. Now, consider representing the various parts of a computer language to be objects with particular attributes. The user could define objects using a standard set of parts (with rules of manipulation) as building blocks. A meta-language using this technique could define all problem-oriented computer languages in a form allowing transformation.

We already know that the three major components of language description are syntax, environment, and semantics. Thus, we need to be able to describe objects (structures) with a syntax grammer like BNF, assert and remove those objects from the environment, and infer object behavior. Given the proper meta-language, objects could be defined with syntactical, environmental, and semantical attributes.

SYNTAX

It is not necessary to reinvent the wheel; a form of enhanced BNF will be used to describe syntax. One major change will be an enhancement which allows things like environmental and sematic attributes to be defined. Category names defined by the user will become objects that have basic attributes called: SYN (syntax description using enhanced BNF); ENV (environment description using standardize functions); and SEM (semantic description using a standardized dictionary) in addition to any attributes defined by primitives (such as bits from semantic operators). Relationships between objects will be defined by these attributes. For example, the syntax attribute can be used to define a parse tree.

This new meta-language has been given the name ABLE for the ABstract Language Expert which will eventually use it. The symbols of the enhanced BNF can be found in Figure 7.

Notice that all category names must eventually terminate in a literal string from the character set of the language. This is important because the operators of the language can now be defined as a certain literal string with semantic meaning.

ENVIRONMENT

If the syntax definition is to be useful then the environment must also be defined.

The environment can be divided into three major areas: language's structure relationships, compiler aids, and computer architecture.

Languages are implemented by compilers on different computer architectures. This makes the language definition dependent on compilers and architectures. As a result, things like compiler directives and word size have an effect on things. For example, code can be inserted (included) from libraries at compile time. Integers may be implemented in 16-bit format on an IBM personal computer and in 32-bit format on a DEC VAX-11/780. While compiler aids and computer architecture are not required for an abstract definition, they are required for any practical definition.

SYMBOL	MEANING
:	Category name assignment, this defines an object.
=	Attribute assignment, this defines an object's attribute.
|	Or, alternate attribute definition.
' '	Literal string, such as keywords.
{ }	Optional components, simplifies shorthand notation.
[ ]	Attribute index, allows access of attribute subparts.
< >	Recursive limiting.
( )	Surrounds an arguement list.
,	List element separator.
;	Attribute assignment separator.
.	Category assignment separator.
@	Preceeds function name.
!	Comment, remainder of line is comment.

Figure 7. ABLE Syntax Symbols

Structure Relationships

The main thrust of the environment is the scope of the various structures. Should a newly declared structure be global to the entire program, local to the sub-program it is defined in, or global to all sub-structures which are declared in the same sub-program? Can the structure being declared reference itself? Functions for manipulating the environment should be able to operate on both defined objects and their attributes. The following primitive functions are in addition to the operators found in the semantic dictionary:

@GLOBAL(object) — scope of object allows access by all structures.

@LEXICAL(object) — scope of object allows access by lexical scope rules.

@LOCAL(object) — scope of object allows access within declaring structure only.

@ALIAS(object) — extends scope of object by providing additional reference.

@ASSERT(object) — place object into current environment.

@EXIST(object) — returns reference (true) if object is in environment otherwise nil (false).

@INHERIT(object) — merges object's attribute values with current definition.

@SYNTHESIZE(object) — builds object from current category down (return from recursion).

@VALUE(object) — returns value (copy) of object.

@SET(object) — assigns value to object.

@ENTER(object) — creates new environment according to scope rules.

@TRANSFER(object) — transfers control to object.

It is important to understand the structure of objects; attributes are objects which are grouped together to form other objects. Thus, each of the above functions can access attributes (sub-objects) by using object-attribute type syntax. *Further, new functions can be defined by using the already defined primitives. The new functions are declared exactly like the category names. This allows the user to expand the dictionary in a valid fashion.*

Compiler Aids

The environment in which a programmer works is becoming increasingly complex but highly productive. Compilers allow code to be organized across files (like code libraries), automatic code generation using macros, and directives to access things like debugging aids. While the compiler aids can prove indispensable in practical programming, they can often be removed from the environment without changing the *standardized* language syntax, environment, or semantics. Since these enhancements are not necessary for proof of feasibility, I will not include them. On the other hand, any practical version of this meta-language will have to include compiler directives.

Computer Architecture

If the abstract computer allows an adequate definition of the hardware environment then anything which manipulates this environment can also be defined. Since the architecture is primitive to all else we must consider it. For example, if the computer did not allow indirect addressing then pointers could not be effectively implemented on this computer.

I have already narrowed the abstract computer's definition but now we must peer at the details. Computers use registers to store information for immediate access. These registers are also used to indicate the computer's current condition (or state).[4] In addition, computers use special communications channels for the Input/Output (I/O) of information. Each of these details must be defined in some fashion if we are to totally define the computer environment.

Accumulator

The accumulator register allows programs to use the results of a computation. Results can be copied from the accumulator into the programs' storage space or reused for the next computation. All computational results are returned through this globally accessed register.

Stacker Pointer

A stack is used in the abstract computer to allow transfer of control to a sub-program and back again. A pointer register indicates the last object placed on the stack. The stack is defined as a Last In First Out (LIFO) structure; therefore, the last object placed on the stack is the only object accessible. The stack doesn't have a size limit for the purpose of this report but a fully implemented meta-language should have a size parameter.

Program Status Register

Some instructions require the return of a condition separate from, sometimes in addition to, a result. Conditions provide a program with the means to transfer control. The transfer may be anticipated (branch) or unanticipated (error). In either case, the program status (PS) register indicates the condition that a program instruction left the computer. For example, an overflow occurs when a program requires that two numbers be multiplied together but the result is too big to be represented by the computer. Since the overflow result cannot be represented itself, it is indicated by a condition flag in the PS register. This allows the program to check for errors and take appropriate action when necessary.

Condition flags are either true or false so they are generally represented by a single bit in the register (although this is not necessary). The most primitive condition flags necessary for computer operation are:

ZERO — true when result is zero.

NEG — true when result is negative.

OVERFLOW — true when result exceeds limits.

UNDERFLOW — true when result is too small to be represented.

CARRY — extra position for bit operations.

Remember, these flags indicate states resulting from program execution. Additional flags are sometimes used to indicate equipment conditions but are not germane to this report.

Ports

The fastest computer in the world is worthless unless it can provide programs with the ability to input/output (I/O) data. I/O can be accomplished through the use of ports which allow access to various peripheral equipment. Since all computer languages require this ability, it is provided through the use of these functions:

@PORT — establishes/defines an I/O port.

@OPEN — prepares port for I/O.

@CLOSE — no further I/O.

@READ — gets input from port.

@WRITE — sends output to port.

Flags such as end-of-line and end-of-file can be defined as conditions set by the above functions.

SEMANTICS

Computers are actually limited to a small set of instructions which are carried out at high speed. Programs are lists of these instructions along with some predefined data. Unfortunately, the meaning of these instructions cannot be determined by syntax or context alone. However, meaning can be defined by the way instructions affect the computer.

Standard Dictionary

Since this report is limited to a specific class of computer, the concepts behind those instructions are similar. I have surveyed assembler languages for three different computers and ascertained which instructions were necessary for the above abstract computer. These instructions have been placed into a semantic dictionary and are primitive to all problem-oriented languages. The dictionary can be found in Appendix A.

Semantic meaning can be associated with specific operators. Several definitions can be chained together to achieve operator meaning if there isn't a direct relationship. While this feature is not necessary for this report, I feel it would be beneficial to be able to add new definitions by combining semantic primitives. This would help to make language definitions more concise.

MINI-PASCAL DEFINED

Now that an overview of language definition and the ABLE meta-language have been accomplished, feasibility of concept can be ascertained by actually defining a language. Defining the language Pascal should provide reasonable proof. However, defining a fully implemented version of Pascal is not necessary. Therefore, I will be defining a subset of Pascal called Mini-Pascal.

MAJOR SEQUENCES

The formal definition of a language begins by defining how a program is constructed. Figure 8 indicates the major sequences in Mini-Pascal. Notice how category name attributes are assigned values. The SYN, ENV, and SEM attributes are basic to all categories but don't necessarily require definition. Category names can be defined which infer meaning to humans, but this technique is not required for a valid language definition.

Program

The SYN attribute clearly indicates the structure of a Mini-Pascal program. Notice that the keyword "PROGRAM" is used as a punctuation mark to indicate the beginning of the program but has no semantic meaning. The PROGRAM category does make an environment definition to assert a structure. A structure of category PROGRAM is asserted into the environment with a name that is synthesized and inherited from IDENTIFIER.

I/O List & Identifiers

Notice that environment or semantic definitions are made with the I/O list. The I/O list is strictly a structure to indicate proper syntax. However, the I/O identifiers are asserted as structures, declared global, and given the port attribute. This last attribute allows the I/O identifier to support I/O operations.

SCOPE-BLOCK

The block is purely organizational. It infers no operational meaning, only heirarchial structure. The scope-block indicates the scope of any declarations made before the CODE_BLOCK. Blocks are asserted without identifiers so they cannot be referenced from other parts of the program.

```
PROGRAM:
    SYN   =   'PROGRAM' IDENTIFIER '(' IOLIST ')' ';' BLOCK '.';
    ENV   =   @not(@exist(SYN[2])          ! IDENTIFIER
              @assert(@inherit(SYN[2])).   ! IDENTIFIER
IOLIST:
    SYN   =   IO_IDENTIFIER
          |   IO_IDENTIFIER ',' IOLIST.
IO_IDENTIFIER:
    SYN   =   IDENTIFIER;
    ENV   =   @not(@exist(SYN[1]))
              @assert(@global(@port(@inherit(SYN[1])))).
SCOPE-BLOCK:
    SYN   =   { 'CONST' CONST_DECLARATION }
              { 'TYPE' TYPE_DECLARATION }
              { 'VAR' VAR_DECLARATION }
              CODE_BLOCK;
    ENV   =   @inherit(SYN[2])             ! CONST_DECLARATION
              @inherit(SYN[4])             ! TYPE_DECLARATION
              @inherit(SYN[6])             ! VAR_DECLARATION
              @assert()
```

Figure 8. Major Declarative Sequences of Mini-Pascal

CONSTANT & TYPE DEFINITIONS

Notice that the Scope-Block infers the order of its component parts. If Figure 9 is examined, it is seen that the CONST_DECLARATION category asserts identifiers into the environment. TYPE_DECLARATION also asserts identifiers into the environment. Since the identifiers, declared by CONST_DECLARATION, have already been globally placed in the environment they affect the ability of the TYPE_DECLARATION category to assert new identifiers. Thus, a dependence is declared.

Implementation Dependence

The TYPE category SEM attribute indicates the size of the object being defined. This attribute should not be defined by standardizing committees except to indicate that it is implementation dependent; however, it does validly define the language Mini-Pascal

as implemented on this compiler/computer. Compiler documentation normally includes this information but not in an integrated formal definition like this.

```
CONST_DECLARATION:
    SYN   =   IDENTIFIER "=" CONSTANT ";"
          |   IDENTIFIER "=" CONSTANT ";"
              CONST_DECLARATION;
    ENV   =   @not(@exist(SYN[1])) @inherit(SYN[3])| IDENTIFIER, CONSTANT
              @inherit(SYN[1]) @assert(@global(SYN[1]))
              @synthesize().
CONSTANT:
    SYN   =   INTEGER | "'"CHARACTER "'" | "NIL";
    ENV   =   @inherit(SYN[1]) @synthesize() | @synthesize().
TYPE_DECLARATION:
    SYN   =   IDENTIFIER "=" TYPE ";" TYPE-DECLARATION;
    ENV   =   @not(@exist(SYN[1])) @inherit(SYN[3])
              @inherit(SYN[1]) @assert(@global(SYN[1])).
TYPE:
    SYN   =   "BOOLEAN" | "CHAR" | "INTEGER" | IDENTIFIER;
    ENV   =   | | | @exist(SYN[1]) @inherit(SYN[1])
              @synthesize();
    SEM   =   @set(BITS,1) | @set(BITS,8) | @set(BITS,16) | .
```

Figure 9. Constant and Type Definitions

Synthesis

The ENV attribute of both CONSTANT and TYPE have synthesis functions. These functions insure that the attributes being defined at lower levels will be passed to higher structures. The inherit function in the higher structures actually makes use of the passed attributes.

VARIABLE & IDENTIFIER DEFINITIONS

Figure 10 continues the SCOPE_BLOCK component part definition with VAR_DECLARATION and CODE_BLOCK. Variables are dependent on the type asserts made previously. If the type is not already declared then the variable declaration will fail. This insures the dependence of variables on TYPE. Notice also that the attributes of type are inherited which forces the variable to be the size of the type.

Identifier

The ability to refer to structures by type is important but the identifiers allow a unique method for identification. The IDENTIFIER structure synthesizes itself provided

that it doesn't already exist. Notice that the exist( ) function is negated with a semantic operator. The operator doesn't give meaning to IDENTIFER, it only modifies the environment function.

```
VAR-DECLARATION:
      SYN    =    VARIABLE ':' TYPE ';' ;
      ENV    =    @exist(SYN[3]) @Inherit(SYN[1]) @Inherit(SYN[3])
                  @assert(@global(SYN[1])) @synthesize().
VARIABLE:
      SYN    =    IDENTIFIER;
      ENV    =    @not(@exist(SYN[1])) @synthesize().
CODE-BLOCK:
      SYN    =    STATEMENT
             |    'BEGIN' STATEMENT_SQUENCE 'END'.
IDENTIFIER:
      SYN    =    LETTER
             |    LETTER IDENTIFIER
             |    DIGIT IDENTIFIER;
      ENV    =    @synthesize().
INTEGER:
      SYN    =    DIGIT | DIGIT INTEGER;
      ENV    =    @synthesize().
LETTER:
      SYN    =    'A' | 'B' | 'C' | 'D' | 'E' | 'F' | 'G' | 'H' | 'I' | 'J' | 'K' | 'L'
             |    'M' | 'N' | 'O' | 'P' | 'Q' | 'R' | 'S' | 'T' | 'U' | 'V' | 'W' | 'X'
             |    'Y' | 'Z';
      ENV    =    @synthesize().
DIGIT:
      SYN    =    '1' | '2' | '3' | '4' | '5' | '6' | '7' | '8' | '9' | '0';
      ENV    =    @synthesize().
```

Figure 10. Variable and Identifier Declarations

STATEMENT DEFINITIONS

The statement category is the bulk of most programs. It is here that the actual instructions are coded. Figure 11 indicates the definitions of Mini-Pascal.

Assignment-Statement

The movement of data within the computer is an integral part of any language. In Mini-Language Pascal this is defined using the semantic primitive *mov*. The attributes of expression must be inherited to insure that the result is retained in the accumulator. The variable then receives the value of the accumulator.

If-Statement

Most of the control in a program is normally done by some sort of decision statement. Here, the *if* statement provides us with the capability of deciding which block of code to execute. The execution is dependent on a comparison which is very similar to a human decision but is based strictly on logic. The *if* statement requires that the comparison be inherited so that it can act based on comparison results. The use of the semantic primitive *call* indicates execution.

Do-Statement

This statement allows the execution of the codeblock as long as the inherited results of the comparsion are true. This is indicated with the use of *call* and *return* primitives. The return primitive insures that the entire statement will be reiterated so long as the COMPARISON is true.

```
STATEMENT_SEQUENCE:
    SYN   =   STATEMENT
          |   STATEMENT ';' STATEMENT_SEQUENCE.
STATEMENT:
    SYN   =   ASSIGNMENT_STATEMENT
          |   IF_STATEMENT
          |   DO_STATEMENT.
ASSIGNMENT_STATEMENT:
    SYN   =   VARIABLE ':=' EXPRESSION;
    ENV   =   @exist(SYN[1])
              @inherit(SYN[3]);
    SEM   =   @mov(ACCUMULATOR,SYN[1]).
IF_STATEMENT:
    SYN   =   'IF' COMPARISON 'THEN' CODEBLOCK
                    { 'ELSE' CODEBLOCK };
    ENV   =   @inherit(SYN[2]);
    SEM   =   @bt(STATUS-ZERO) @call(SYN[4]) @ret()
          |   @not(@bt(STATUS-ZERO)) @call(SYN[6]) @ret().
DO-STATEMENT:
    SYN   =   'WHILE' COMPARISON 'DO' CODEBLOCK;
    ENV   =   @inherit(SYN[2]);
    SEM   =   @bt(STATUS-ZERO) @call(SYN[4]) @ret().
```

Figure 11. Statement Definitions

COMPARISON DEFINITIONS

Comparisons are necessary for any type of decision making. This was reflected in both the IF and DO statements above. The comparison merely reflects the relationship between expressions by setting the flags in the STATUS register. This way the comparison results can be examined for some control decision. The SEM attributes make large use of dictionary primitives and can vary widely from computer to computer. Their use does allow us to know the exact nature of the comparisons without having to infer or describe in lengthy English prose.

```
COMPARISON:
    SYN   =   EXPRESSION '=' EXPRESSION
          |   EXPRESSION '<' EXPRESSION
          |   EXPRESSION '>' EXPRESSION
          |   EXPRESSION '< >' EXPRESSION
          |   EXPRESSION '< =' EXPRESSION
          |   EXPRESSION '> =' EXPRESSION;
    SEM   =   @cmp(SYN[1],SYN[3]) @bt(STATUS-ZERO)
          |   @cmp(SYN[1],SYN[3])
              @and(@not(@bt(STATUS-ZERO)),@not(@bt(STATUS-NEG)))
          |   @cmp(SYN[1],SYN[3]) @bt(STATUS-NEG)
          |   @cmp(SYN[1],SYN[3]) @not(@bt(STATUS-ZERO))
          |   @cmp(SYN[1],SYN[3]) @not(@bt(STATUS-NEG))
          |   @cmp(SYN[1],SYN[3])
              @or(@bt(STATUS-ZERO),@not(@bt(STATUS-NEG))).
```

Figure 12. Comparison Definition

EXPRESSIONS

The numerical worth of all computers can be assessed by how well they handle expressions. These are arithmetic operations which return a result through the accumulator. Errors in math must be watched for by using the status register. That is the reason for STATUS flag testing. Evaluation of the expression will fail if certain conditions are met (like overflow).

CONCLUSION

Review

The previous exercise in language definition was enlightening. Certain operations were difficult to define but I related these to inadequacies in the ABLE metalanguage syntax. Most research on language analysis has been done using natural languages and are not germane to computers. Since information on this subject is very limited, much of the work was original. However, much of the definition did succeed. The semantic dictionary was a good start but the primitives were just too primitive. The ability to add definitions would aid the process greatly.

```
EXPRESSION:
    SYN   =   FACTOR
          |   FACTOR '*' EXPRESSION
          |   FACTOR 'DIV' EXPRESSION
          |   FACTOR 'MOD' EXPRESSION
          |   FACTOR 'AND' EXPRESSION;
    SEM   =   |     @mul(SYN[1],SYN[3]) @bt(@not(STATUS-OVERFLOW))
          |   @dlv(SYN[1],SYN[3]) @bt(@not(STATUS-UNDERFLOW))
          |   @sub(SYN[1],@dlv(SYN[1],SYN[3]))
              @bt(@not(STATUS-UNDERFLOW))
          |   @and(SYN[1],SYN[3]).
FACTOR:
    SYN   =   CONSTANT | VARIABLE.
```

Figure 13. Expression Definition

Recommendations

Overall, I feel that the method is feasible and that a full-blown research project should be started to provide a standard meta-language.

I have already started the development of an automatic language translator. It currently provides a limited user interface in a form which allows easy modification. A meta-language parser allows the digestion of a language definition for syntax only. The standard functions need to be added for environment and semantic attributes.

The program is currently implemented in Turbo-C version 1.5 and runs on a IBM-AT compatible computer. The program is called FABLE and is written for transportability. It is my hope that it will be developed enough to translate itself onto another hardware platform such as a work station in the near future.

APPENDIX A
SEMANTIC DICTIONARY

General attributes: All definitions include two attributes.

BITS: This field indicates the number-of-bits being affected.

FLAG: This field indicates which of the status register flags are updated.

Data Transfer

MOV — move data, two operand operator

LOA — load offset address, one operand operator

LAA — load absolute address {pointer}, one operand operator

Stack

PUSH — push, one operand operator

POP — pop, one operand operator

Input/Output

IN — input from port, two operand operator
OUT — output to port

Type Conversion — Perhaps only one is required

CONV — convert data type, extend N bits

Flag — Should there be a clear/set primitive for each flag or one?

SETF — set flag, one operand operator
CLRF — clear flag, one operand operator

Arithmetic

ADD — add, two operand operator
INC — increment
SUB — subtract, two operand operator
DEC — decrement
NEG — two's complement negation
IDIV — integer divide
IMUL — integer multiply
FDIV — real divide

Logical

AND — logical and, two operand operator
OR — inclusive or, two operand operator
XOR — exclusive or, two operand operator
NOT — one's complement negation, one operand operator

Bit Shift

ROL — rotate left, one operand operator
ROR — rotate right, one operand operator
SHL — shift left, one operand operator
SHR — shift right, one operand operator

Compare

CMP — compare two operands, two operand operator
TEST — logical compare
BT — bit test returns true if bit is set

Unconditional Transfer

CALL — call procedure
INT — interrupt
IRET — interrupt return
RET — return from procedure
JMP — jump unconditionally

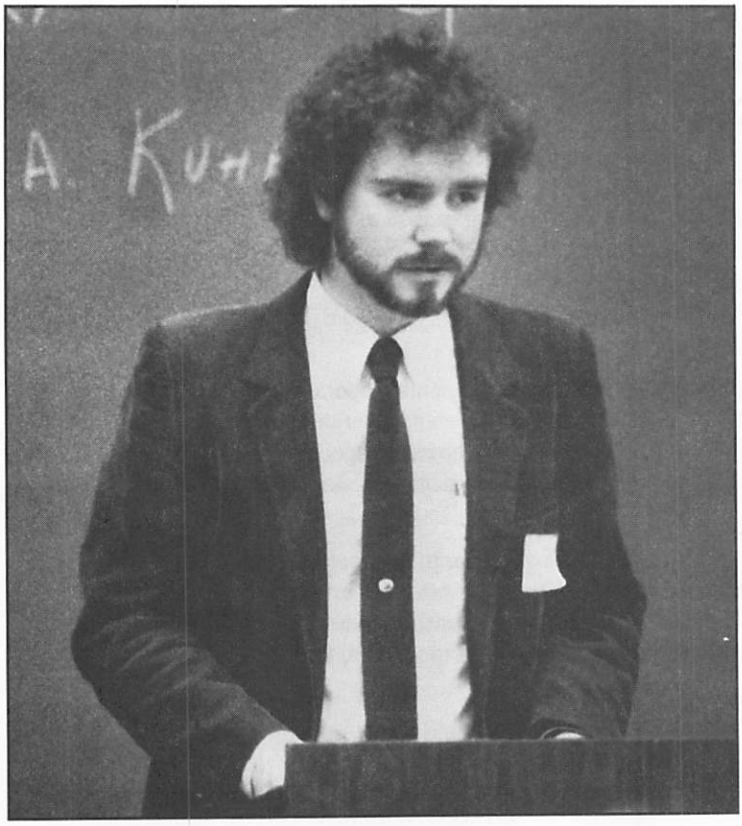
ENDNOTES

[1]Technically, these compilers were assemblers which were very machine dependent and only generated one machine instruction for each code instruction. Compilers are less machine dependent and provide several machine instructions for each code instruction.

[2]Our discussion will be limited to languages with static scope.

[3]Purists will note that addition is primitive to math operations like subtraction.

[4]While it is common to have multiple "general purpose" registers in a computer processor, the main purpose of these registers is to speed computations. Since these registers are not necessary for the computer's operation, they will not be discussed.



David Carroll presents Showcase paper.

MY POEM'S TOO BUSY, LIKE...

Sharon Andrews

Boston,
England's Brat grown up: New World Sophisticate attired in
history
culture
education.

Brain Child: Harvard, MIT. Lifeblood of New England. Major artery
hi tech
pumping commerce westward
civility

Gourmand: Ingester of the Almighty Buck. Taxachussetts. Swallowing
up a week's pay. Spitting out small change.
High price to fork up.
#1 cost of living.

Illusionist: Creator of auras: WASP, Blueblood, Prude, Snob.
Beacon Hill Sons of Liberty—stand high, look down
with parallax views on books, busing, and others'
liberties.
Staid Conservatives.

Shrewd Yankee: Dyed-in-the-wool ingenuity.
Fortunes made once at any cost. Imports. Exports.
Honey Fitz Kennedy. Luck of the Irish. Old Southie.
The North End, Jamaica Plain, Immigrants struggling.
New profit margins belong to
Yuppies,
Corporations,
"The Prudential."

Politician: Rose, John, Bobby, Ted. And Tip O'Neill.
Shamrock Power . . . dead yet? Not while the Celtics
still have the ball. Tossed it to a Greek:
Dukakis.
Grandpa said, "I'd rather vote for a President than a Duke!"

Sharon Andrews' poem was written for Education 417, "Language Across the Curriculum," Joyce Honeychurch, Professor, UAA Education Department.

Prima Donna: Lady of the Northeast.
Lead dancer on the Freedom Trail.
Face to the Atlantic.
A whole nation behind...her chorus line.

City Slicker: Swanboats on the commons, sails on the Charles.
Serene glides under the thousand glass eyes of
skyscrapers,
warehouses,
hallowed brick halls decked in ivy tresses.
The Harbor. The lights. Glitz by night: The Combat Zone.
Turnpikes, tankers, air international.
Windstrewn slums.
Lofty penthouses.
Taxis on Tremont.
People en masse.
Masses of people,
In a hurry
To make ends meet.

Boston: Home of the Red Sox, the Celtics, the Bruins, the Pops.
The "Athens of America"
and
"Cradle of Liberty."
the one-time
"Hub of the Universe."

EFFECTS OF LOOKING, SMILING, AND FORWARD LEAN ON EVALUATIONS IN TWO-PERSON OPPOSITE-SEX INTERACTIONS

Christy Taylor

Abstract

Men and women spoke about themselves for five minutes to an opposite-sex listener who manipulated one of eight combinations of looking, smiling, and forward lean. Men and women gave more favorable evaluations to listeners who looked and smiled. Evaluations were not directly influenced by the listener's forward lean. Men preferred a listener who smiled and leaned and women preferred a listener who smiled but did not lean. Subjects' estimates of the listener's behaviors indicated they were aware of the high and low looking, smiling, and leaning behaviors. However, estimates of actual amounts of listener looking, smiling, and forward lean were not very accurate. Multiple regression analyses were computed to predict effects of the listener's actual behavior and subjects' perceptions of the listener's behavior on subjects' evaluations. It was concluded that a person's estimates of their reactions to another's looking, smiling, and forward lean cannot be generalized to their reactions in real life.

This study was designed to investigate the interactive effects of looking, smiling, and forward lean on evaluations in two-person opposite-sex interactions. Although nonverbal behavior has been an active research area for over twenty years, few studies have analyzed combinations of nonverbal behaviors in personal interactions. Mehrabian[1] conducted some early studies of interactive effects of nonverbal behaviors. In the decoding studies, subjects evaluated people in photographs who displayed various degrees of forward lean and open or closed and relaxed or tense body posture. In general, forward lean and relaxed posture communicated the most positive attitude. An open body posture was more preferable in women than in men. In the encoding studies, subjects approached an imaginary person who differed in status or likability. In the liking study, subjects engaged in lowest amounts of looking and forward lean toward a disliked person and highest amounts of looking and forward lean toward a moderately liked person.

Because of the artificiality of Mehrabian's[2] methodology, it is important to replicate his findings in real-life interactions. Interestingly, little work has been done in this area because nonverbal researchers have directed their activities toward other questions. One exception is a study of Kleinke, Staneski, and Pipp[3] in which female confederates manipulated their gaze and distance from male subjects. Subjects were generally more favorable toward the gazing confederate, but were not influenced by her

Christy Taylor's paper was written for Psychology 420, "Research Methods," Bruno Kappes and Chris Kleinke, Professors, UAA Psychology Department.

distance. Other researchers investigated the influence of nonverbal behaviors on evaluations in counseling sessions[4] and job interviews.[5] Because these studies compared combinations of nonverbal behaviors, it was not possible to assess their individual effects.

On the basis of past research, what kinds of predictions can be made about the influence of looking, smiling, and forward lean on first impressions in opposite-sex interaction? The body of research on gaze is the most comprehensive and suggests that looking will result in favorable evaluations in a nonthreatening and friendly encounter.[6] Mehrabian's[7] research predicts a generally positive effect on first impressions of forward lean. Less research has been conducted on first impressions of smiling. Studies of photograph ratings suggest that smiling people are evaluated more favorable than nonsmiling people[8] and that non-smiling women are evaluated more negatively than nonsmiling men.[9] D'Augelli[10] found that smiling was positively correlated with ratings of college students' therapeutic talent.

It is not possible on the basis of past research to make predictions about specific interactive effects of looking, smiling, and forward lean. However, it was of interest to determine whether men and women would differ in their reactions when these behaviors were all present (highest intimacy) or all absent (lowest intimacy).

METHOD

Subjects

Subjects were 65 female and 70 male volunteers from introductory psychology and sociology courses who received course credit for participation. Subjects ranged from 18 to 40 years in age ($\underline{M}$ = 23.2, $\underline{SD}$ = 6.63). Seventy-five percent were under 26 years of age.

Procedure

The experiment was described as a study about how people get to know each other. Subjects were introduced to an opposite-sex confederate and participants were told that one of them would speak while the other listened. The subject was always the speaker and the confederate was always the listener. Subjects spoke about themselves for five minutes, following a protocol with innocuous and non-embarrassing topics (e.g., Where were you born? What is your favorite food? Describe your dream vacation. What are some of your hobbies?). During this interaction, the confederate manipulated one of eight combinations of look—no look, smile—no smile, lean—no lean behaviors. When five minutes were completed, the experimenter took the confederate to a different room and asked subjects to complete an evaluation form. Subjects were debriefed when the experiment was completed.

Confederates

Confederates were four men and four women ranging in age from 23 to 25 years. Confederates were trained to behave in a standard manner and were not aware of dependent measures used in the study. Each confederate participated in an approximately equal number of experimental conditions, which were varied in random order.

Independent Variables

Look—no look. When looking, confederates gave subjects as much gaze as

possible without giving the illusion of staring. When not looking, confederates focused their gaze on the list of topics the subjects were addressing and only gazed at subjects at the beginning and end of the study.

Smile—no smile. Smiling confederates smiled a minimum of one time during each topic addressed by subjects. Subjects were instructed to smile at times when it seemed most appropriate. Nonsmiling confederates never smiled during their interaction with the subject.

Lean—no lean. Leaning confederates leaned toward the subjects during the course of the study. Nonleaning confederates sat straight in their chairs during the course of the study.

Dependent Variables

Subjects evaluated the confederate on a rating form containing bi-polar adjectives that were found in previous research to discriminate between liked and disliked persons,[11] sincere-insincere, trustworthy-untrustworthy, intelligent-unintelligent, thoughtful-thought-less, considerate-inconsiderate, friendly-unfriendly, courteous-discourteous, polite-impolite, cooperative-uncooperative, capable-incapable, attentive-inattentive, competent-incompetent. Adjectives listed first were scored 10 and adjectives listed second were scored 1. Subjects also rated how much they liked the confederate and how much they felt the confederate liked them (10 = very much, 1 = not at all). Finally, subjects estimated how much their impressions of the confederate were influenced by the confederate's looking, smiling, and body posture (10 = very much, 1 = not at all). For manipulation checks, subjects estimated the percentage of time the confederate looked, smiled, and leaned forward.

RESULTS

Manipulation Checks

Subjects' estimates of the confederate's percentage of looking, smiling, and forward lean were analyzed with ANOVA in a 2(Subject Sex) × 2(Look-no look) × 2(Smile-no smile) × 2(Lean-no lean) factorial design.

Looking. Subjects estimated that gazing confederates looked at them significantly more often than nongazing confederates (Ms = 84.2% vs. 20.8%; $F(1, 119) = 230$, $p < .0001$). Subjects also estimated that smiling confederates looked more often than nonsmiling confederates (Ms = 57.9% vs. 44.5%; $F(1, 119) = 8.48$, $p < .005$).

Smiling. Subjects estimated that smiling confederates smiled at them significantly more often than nonsmiling confederates (Ms = 57.9% vs. 13.9%; $F(1, 119) = 101$, $p < .0001$). Subjects also estimated that looking confederates smiled more often than nonlooking confederates (Ms = 46.5% vs. 27.9%; $F(1, 119) = 17.2$, $p < .0001$).

Leaning. Subjects estimated that leaning confederates leaned toward them significantly more often than nonleaning confederates (Ms = 56.4% vs. 8.23%; $F(1, 119) = 94.5$, $p < .0001$). Subjects also estimated that smiling confederates leaned toward them more often than nonsmiling confederates (Ms = 41.9% vs. 21.7%; $F(1, 119) = 14.8$, $p < .0001$).

Factor Analysis of Rating Form

Factor analysis of rating form items with a principal components solution and

varimax rotation resulted in one factor explaining 66% of the variance (eigenvalue = 9.25). Since it was clear that all rating form items loaded on a single evaluative dimension, the 14 items were averaged into a total score.

Evaluation of Confederate

The average total score on the rating form was analyzed with ANOVA in the above defined 2 × 2 × 2 × 2 design.

Looking. A significant main effect for looking ($F(1, 119) = 13.8$, $p < .0001$) indicated that subjects were more favorable toward the looking versus nonlooking confederate (Ms = 7.77 vs. 6.80).

Smiling. A significant main effect for smiling ($F(1, 119) = 15.4$, $p < .0001$) indicated that subjects were more favorable toward the smiling versus nonsmiling confederate (Ms = 7.76 vs. 6.75).

Leaning. The main effect for confederate leaning was not significant.

Sex × smile × lean interaction. A significant Subject Sex × Smile × Lean interaction ($F(1, 119) = 4.47$, $p < .04$) is displayed in Table 1. This interaction indicates that men had greatest preference for a woman who smiled and leaned, while women had greatest preference for a somewhat less intimate man who smiled but did not lean.

Subjects' Estimates of Influence

Subjects' estimates of how much they were influenced by the confederate's looking, smiling, and body posture were analyzed with 2 × 2 × 2 × 2 ANOVAS.

TABLE 1

SUBJECT SEX × SMILE × LEAN INTERACTION ON TOTAL EVALUATION SCORE

	Smile Lean	Smile No Lean	No Smile Lean	No Smile No Lean
Male Subjects	8.32	7.60	6.68	7.19
Female Subjects	7.18	7.98	6.66	6.44

Influence of looking. Subjects estimated they were more influenced by the confederate's looking when the confederate looked (Ms = 7.52 vs. 6.77; $F(1, 119) = 4.43$, $p < .05$). Women estimated they were more influenced by the confederate's looking than did men (Ms = 7.60 vs. 6.84; $F(1, 119) = 4.38$, $p < .05$).

Influence of smiling. Subjects estimated they were more influenced by the confederate's smiling when the confederate smiled (Ms = 7.99 vs. 6.80; $F(1, 119) = 12.9$, $p < .0001$). Women estimated they were more influenced by the confederate's smiling than did men (Ms = 7.78 vs. 7.09; $F(1, 119) = 4.30$, $p < .05$).

Influence of body posture. A significant Sex × Look × Smile interaction ($F(1, 119) = 11.1$, $p < .001$) can be explained in the following manner. Men estimated they were most influenced by the confederate's body posture when the confederate either

looked and smiled or neither looked nor smiled. No confederate behaviors affected women's estimates of influence by confederate's body posture.

Correlations with Total Evaluation Score

Correlations were computed between total evaluation score and the following variables: manipulation checks, subjects' estimates of influence, and independent variables (see Table 2).

TABLE 2

CORRELATIONS WITH TOTAL EVALUATION SCORE

Manipulation Checks	Total Evaluation Score
Estimated Looking	.51[a]
Estimated Smiling	.50[a]
Estimated Forward Lean	.13
Estimated Influence	
Influenced by Looking	.01
Influenced by Smiling	.11
Influenced by Body Posture	—.05
Independent Variables	
Look	.30[a]
Smile	.31[a]
Lean	—.03

[a]p .001

Manipulation checks. Correlations between total evaluation score and estimates of how much the confederate looked and smiled were significant. Total evaluation score did not correlate with estimates of the confederate's forward lean.

Estimates of influence. There were no significant correlations between total evaluation score and subjects' estimates of how much they were influenced by the confederate's looking, smiling and leaning.

Independent variables. Correlations between total evaluation score and confederates' manipulated looking and smiling were significant. Total evaluation score did not correlate with confederate's manipulated leaning.

Predicting Total Evaluation Score

Manipulation checks. A multiple regression analysis was computed using subjects' estimates of how much the confederate looked, smiled, and leaned to predict total evaluation score. Preliminary analysis was conducted using a full model with all main effects and interactions in the 2 × 2 × 2 × 2 design. All significant effects from this analysis were then analyzed in a restricted model which obtained an $R = .637$, $p < .0001$. According to this model, Total Evaluation Score = .577 Estimated Looking

+ .803 Estimated Smiling − .653 Estimated Looking × Smiling. Total evaluation score is best predicted by estimates of how much the confederate looked and smiled, with one exception. Subjects' evaluations of the confederate were lowered when they perceived the confederate to be high in both looking and smiling.

Estimates of influence. A multiple regression analysis predicting total evaluation score with subjects' estimates of how much they were influenced by the confederate's looking, smiling, and body posture found no significant effects.

Independent variables. A multiple regression analysis predicting total evaluation score with independent variables resulted in a restricted score with $R = .461$, $p < .0001$. According to this model, Total Evaluation Score = .297 Looking + .249 Smiling + .160 Sex × Smiling × Forward Lean.

DISCUSSION

Results of this study are notable for their clarity. Men and women gave most favorable ratings to an opposite-sex listener who looked and smiled as they were speaking. Subjects' ratings were not directly affected by the listener's forward lean. An interaction between smiling and leaning indicated that men had greatest preference for a listener who smiled and leaned. Women gave more favorable ratings to a listener who smiled but did not lean.

Data for manipulation checks and subjects' estimates of how much they were influenced by the confederate's looking, smiling, and body posture have implications for the question of people's awareness of factors influencing their behaviors.[12] Subjects were aware of differences in the confederate's looking, smiling, and forward lean, but their estimates of these behaviors were not very accurate. Greatest inaccuracies were 20.8% looking and 13.9% smiling for confederates who only looked or smiled at the very beginning and end of the experiment and 56.4% forward lean for a confederate who leaned forward during the entire experiment. Kleinke and Walton[13] reported data showing that people cannot accurately estimate their own nonverbal behaviors.

Also of interest are subjects' estimates of how much they were influenced by the confederate's looking, smiling, and body posture. Women claimed they were more influenced than men by the confederate's looking and smiling. In actuality, the effects of looking and smiling on men and women were equal. We can see that men's and women's scripts for how they react to an opposite-sex person's looking and smiling do not necessarily match their actual behaviors. Another example of the inaccuracy of scripts comes from the multiple regression analyses showing that looking and smiling had almost equal effects on subjects' rating of the listener. When using subjects' perceptions of the confederate's looking and smiling (manipulation checks) to predict their ratings, the results are very different. Looking and smiling are given much stronger positive weights, but the combination of smiling and looking is weighted negatively. These results are reminiscent of data reported by Kleinke, Bustos, Meeker, & Staneski.[14] Subjects were asked to complete a rating form after imagining they had received high or low gaze or personal closeness from an opposite-sex person. Subjects' predicted reactions to gaze and closeness were stronger and more complex than the reactions of subjects in the actual experiment. It is clearly inappropriate to generalize people's expected (scripted) reactions to another person's nonverbal behaviors to their responses in real life.

The present study indicates that men and women are both appreciated as good

listeners when they look and smile at an opposite-sex speaker. These results can be contrasted with those from a dating study where people chose opposite-sex dates after viewing them in videotaped interviews.[15] Women tended to prefer men who engaged in high amounts of looking and smiling while men preferred women who engaged in low amounts of looking and smiling. While men and women may respond in similar ways to an opposite-sex listener, they appear to make different attributions about nonverbal behaviors of an opposite-sex person in a dating situation.[16] This is a useful issue to explore future research.

ENDNOTES

[1]A. Mehrabian, "Inference of Attitudes from the Posture Orientation, and Distance of a Communicator," Journal of Counseling and Clinical Psychology 32 (1968) 296-308; A. Mehrabian, "Relationship of Attitude to Seated Posture, Orientation, and Distance, Journal of Personality and Social Psychology 10 (1968) 26-30.

[2]Ibid.

[3]C. L. Kleinke, R. A. Staneski, S. L. Pipp, "Effects of Gaze, Distance, and Attractiveness on Males First Impressions of Females," Representative Research in Social Psychology 6 (1975): 7-12.

[4]B. R. Fretz, R. Corn, J. M. Tuemmler, and W. Bellet, "Counselor Nonverbal Behaviors and Client Evaluations," Journal of Counseling Psychology 26 (1979): 304-311.

[5]A. S. Imada and M. D. Hakel, "Influence of Nonverbal Communication and Rater Proximity on Impressions and Decisions in Simulated Employment Interviews," Journal of Applied Psychology 62 (1977): 295-300; K. G. Rasmussen, "Nonverbal Behavior, Verbal Behavior, Resumé Credentials, and Selection Interview Outcomes," Journal of Psychology 69 (1984) 551-556; J. H. Sterrett "The Job Interview: Body Language and Perceptions of Potential Effectiveness," Journal of Applied Psychology 69 (1978): 551-556.

[6]C. L. Kleinke, "Gaze and Eye Contact: A Research Review," Psychological Bulletin 100 (1986): 78-100.

[7]A. Mehrabian, "Verbal and Nonverbal Interaction of Strangers in a Waiting Situation," Journal of Research in Personality (1971); A. Mehrabian, Nonverbal Communication (Chicago: Adline-Atherton) (1972); Mehrabian, "Inference of Attitudes," 296-308; Mehrabian, "Relationship of Attitude," 16-30.

[8]S. Lau, "The Effect of Smiling on Person Perception," Journal of Social Psychology 117 (1982) 63-67; K. T. Mueser, B. W. Grau, S. Sussman, and A. J. Rosen "You're Only as Pretty as You Feel: Facial Expression as a Determinant of Physical Attractiveness," Journal of Personality and Social Psychology 46 (1984): 469-478.

[9]F. M. Deutsch, D. LeBaron & M. M. Fryer, "What is in a Smile?" Psychology of Women Quarterly 11 (1987): 341-352.

[10]A. R. D'Augelli, "Nonverbal Behavior of Helpers in Initial Helping Interactions," Journal of Counseling Psychology 21 (1974): 360-383.

[11]N. H. Anderson, "Likableness Ratings of 555 Personality-Trait Words," Journal of Personality and Social Psychology 9 (1968): 272-279; A. J. Lott, B. E. Lott, T. Reed, and T. Crow, "Personality-Trait Descriptions of Differentially Liked Persons," Journal of Personality and Social Psychology 16 (1970): 284-290.

[12]R. E. Nisbett, & T. D. Wilson, "Telling More Than We Know: Verbal Reports on Mental Processes," Psychological Review 84 (1977): 231-259.

[13]C. L. Kleinke, & J. H. Walton, "Influence of Reinforced Smiling on Affective Responses in an Interview," Journal of Personality and Social Psychology 42 (1982): 557-565.

[14]C. L. Kleinke, A. A. Bustos, F. B. Meeker, and R. A. Staneski, "Effects of Self-Attributed and Other-Attributed Gaze on Interpersonal Evaluations Between Males and Females," Journal of Experimental Social Psychology 9 (1973): 154-163.

[15]R. E. Riggio and S. B. Woll, "The Role of Nonverbal Cues and Physical Attractiveness in the Selection of Dating Partners," Journal of Social and Personal Relationships 1 (1984): 347-357.

[16]R. L. Shotland and J. M. Craig, "Can Men and Women Differentiate Between Friendly and Sexually Interested Behavior?" Social Psychology Quarterly 51 (1988): 66-73; A. Abbey and C. Melby, "The Effects of Nonverbal Cues on Gender Differences in Perceptions of Sexual Intent," Sex Roles 15 (1986): 283-298; A. Abbey, "Sex Differences in Attributions for Friendly Behavior: Do Males Misperceive Females' Friendliness?" Journal of Personality and Social Psychology 42 (1982): 830-838.

THE ALCHEMY OF DAVID FELKER AND ART POVERA

Janet Keim

Abstract

I originally gave "The Alchemy of David Felker and Art Povera" as a slide/paper presentation for advanced sculpture and then for the "Student Showcase." This paper is revised for publication in the UAA Student Showcase Journal. It is based on an interview with the Alaskan sculptor, David L. Felker, and explores the similarities between his art and philosophy and that of the genre of art known as "Art Povera." This paper focuses on Felker because he is gaining national acclaim and his work is known by the other class members. The presentation was also meant to give information on internationally recognized artists whose work is characterized as Art Povera by material and motive. I hoped that by making comparisons between the work of David Felker and internationally known Art Povera artists, that I would gain greater insights into that genre and thus respond to the semester's topic with greater appreciation.

Some of the characteristics of Art Povera are the type of materials used and the profound interest in the process itself. In the book, Art Povera, Germano Celant has identified the materials as comprised of animal, vegetable, and mineral.

The artist can be fascinated with a certain element of nature. For instance, in 1968 at the Konrad Fisher Gallery, Jan Dibbets created innovative forms with rolled turf, a mud puddle, and stick bundles. Michael Heizer became involved with nature in a larger way through landscape art. In a work called "Circumflex," he dug a 120-foot-long trench in the form of a loop on Massacre Creek Dry Lake in 1968.[1]

Experimentation with fabric or fibers, both natural and synthetic, is a characteristic of many Art Povera artists. One of the most notable was Eva Hesse. At the Castelli

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Janet Keim's paper was written for Art 411, "Advanced Sculpture," Ken Gray, Professor, UAA Art Department.

Warehouse Show in December of 1968, a piece called "Augment," comprised of 20 units of latex on canvas laid out on the floor, was shown together with "Aught," made of 4 units of double sheets of latex stuffed with polyethylene hung on the wall.[2]

Light—whether neon, candle, or incandescent—can be a provocative element. In 1967, Michelangelo Pistoletto created a simple work of art by setting a long line of flaming candles on a stretch of reflective aluminum paper.[3]

Sometimes artists are involved with a particular subject, such as the human figure, and seek to resolve their idea in an Art Povera manner. Bruce Nauman made a 1967 piece entitled "Hand to Mouth." It was a mold of a person's right hand and arm, shoulder, neck, chin and mouth, comprised of wax over cloth and hung against a wall.[4]

Not only will most Art Povera artists use materials that are generally simple and inexpensive, but diverse as well: On the walls and floor of the Ricke Gallery in Cologne, October 1969, Richard Serra displayed an assortment of flat or rolled lead sheets, straight iron rods, and floppy strips of rubber.[5] Jannis Kounellis' "Metamorphosis", 1975-84, is a large wall relief enclosed in an iron structure and is an assemblage of diverse elements such as wood, fragments of plaster casts, a table, and mixed media all arranged in horizontal bands. Rebecca Horn has used electro-mechanical devices and mixed media such as quicksilver. Mario Merz is known for his igloo-like structures. Art critic Bruno Cora has said ". . .all of Mario Merz's work. . .like a galactic spiral, involves the whole universe of matter and material in their construction."[6]

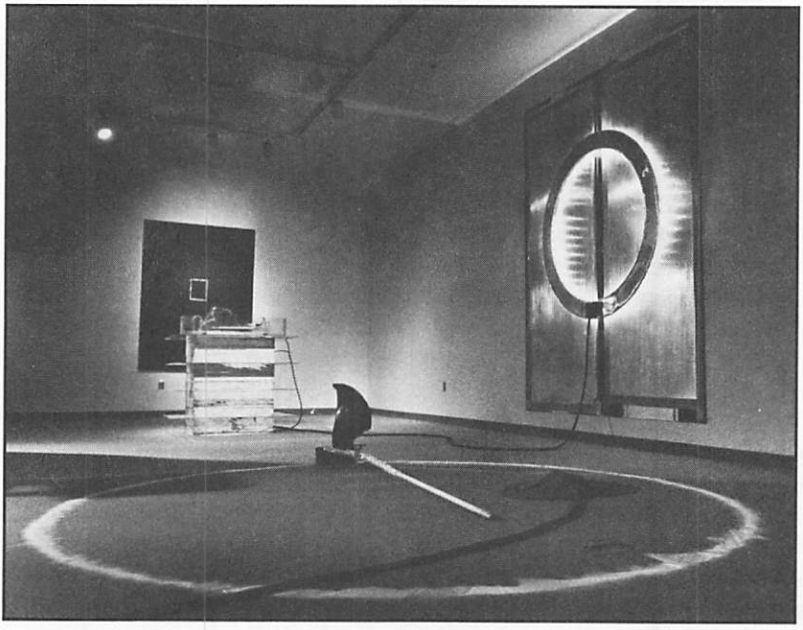

Figure 1. Alchemy of the Wand

David Felker's sculpture is similar to Art Povera. Materials are important to Felker in a philosophical sense. He finds it difficult to use only one type of material like bronze or stone. He perceives nothing in life to be of only one thing. In creating his own art

work, it's much more in tune with life if it has a variety of media in it to create that statement. An example of this is "Alchemy of the Wand," Figure 1, a 1988 installation and performance. Ron Glowen, a critic writing for Artweek in February of that same year, described the sculptural installation: "The various constructions use common building materials (sheet metal, glass, wood) and mechanisms (incandescent light, motors, electric current) in conjunction with states of matter (solid material, water, compressed air, heat and light)."[7]

Felker also believes an artist should do the best for the least amount of money. This is born out of both economic necessity and aesthetic preference. Felker's watchword is innovation. He believes innovation and the spontaneity to materials can create some wonderful artwork. The restriction of not having a lot of money to spend invokes the problem-solving process and that becomes the impetus for innovation. Even for large commission works, he keeps a close eye on costs and has to consider what the best approach would be, economically, so he can get a fair monetary return for his work. Necessity is the mother of invention.

One of the characteristics of Felker's work is his craftsmanship approach to his art. It is put together well. He feels that this quality of work is an indication of the integrity of what he believes in. He takes his work from the beginning with the highest degree of intention and integrity and carries it through all the way. He believes in planning worthwhile concerns to his work so he doesn't wind up having to repair it on a continuous basis, or be embarrassed by it falling down after he sets it up. Museums and galleries will look for inherent flaws, because if a piece is not of quality workmanship they won't pay the insurance on it if something happens to it. So, the quality and manner and way in which one creates a piece reflects the integrity of one's own thinking and whether or not one understands what they're doing.

However, there's a lot of art work that does have a rather crude sort of approach to it. And that can be very stylistic and the major element for the art. A lot of times in his own work he will leave flaws deliberately in a piece, but if you look at the overall content of the work, you will see it's an integrated element. Felker points out that in some of the most crude or naively put together art work, for instance, primitive art, you can see all the flaws, but that's what creates the magic. But even then you sense and understand the craftsmanship that it took in order to do the piece. It's an integration, sensitivity, and understanding of the materials and aesthetics as to whether or not it works well.

Figure 2 shows Felker's newest installation that opened at the Sonic Art Gallery in San Diego in March of 1989. Wherever he is located, Felker seeks out and collects materials. But he is not the type of artist to use the newest innovation in material that research has created simply because chemists have made it available. He is more interested in finding materials for an object that have a certain magic about them, a certain kind of shape or consistency that would work with his particular concept. Materials are a problem-solving process for him. He may start out with an idea and start looking for materials, or quite often he will find an object or piece of material that may key an idea for him. There are a multitude of approaches. Since he has been in Alaska, he has deliberately wanted to have the environment be an influence on his work.

Art Povera is concerned with the process of making art—not the commercial aspects of the finished product. For Felker, the motive in creating art is of a personal nature, not to make money. That can distort the true picture of what art is all about,

which is a very spiritual process for him. It is sacred ground; communication with the inner self. The statements he creates in his art have to do with what he believes in. He tries to touch realities about himself and the ultimate truths of life. He tries to create situations or objects of a mystical nature, so that he and his audience can be drawn to a higher level of consciousness.

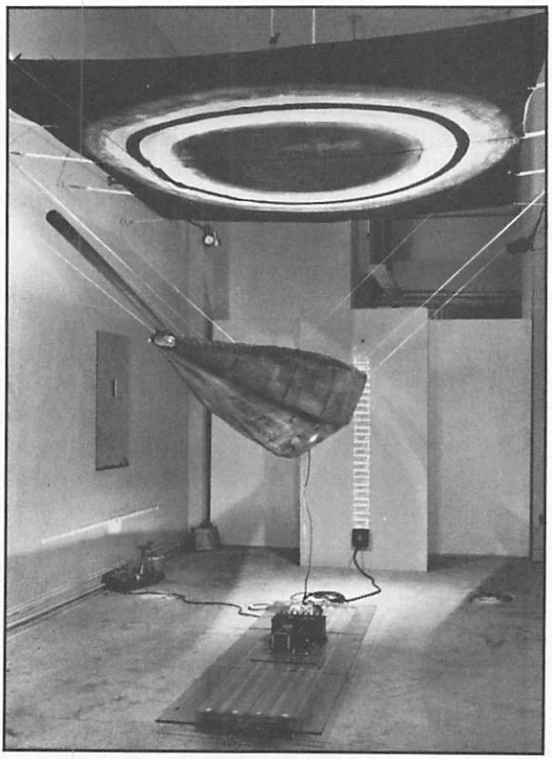

Figure 2. Sonance from the Vessel

His sculpture, (Figure 3) called "The Arc," was installed for a show at the Anchorage Museum of History and Art in 1987. According to a feature in the Anchorage Daily News, this sculpture was comprised of the following:

> . . .a huge steel triangle hung on a wall, attached by an electrical wire to a 30-foot sheet of glass on the floor. The glass covered a photo of a 4-year-old girl. . . . According to Felker, the glass was the stream of life, the triangle represented the ultimate spiritual being, and the wire was a modern-day equivalent of the hand of God bringing life to the girl, as in Michelangelo's 'The Creation of Adam' on the ceiling of the Sistine Chapel.[8]

As with most Art Povera artists, Felker works conceptually. His ideas are almost always spontaneous and they parallel the intuitive process to materials. He does not care

to work in a meticulous design-oriented manner. The magic and energy can be lost that way. This intuitive side of Art Povera artists is based on trusting themselves, trusting what their own feelings are about. Felker believes that the "intuitive" occurs when you are in communication with that inner spirit, and you're not thinking about it specifically, but letting it take its own course. He believes if you can maintain a balance between that conscious idea about what you want to accomplish and the intuitive, then that will even be understood by the audience on an intuitive level.

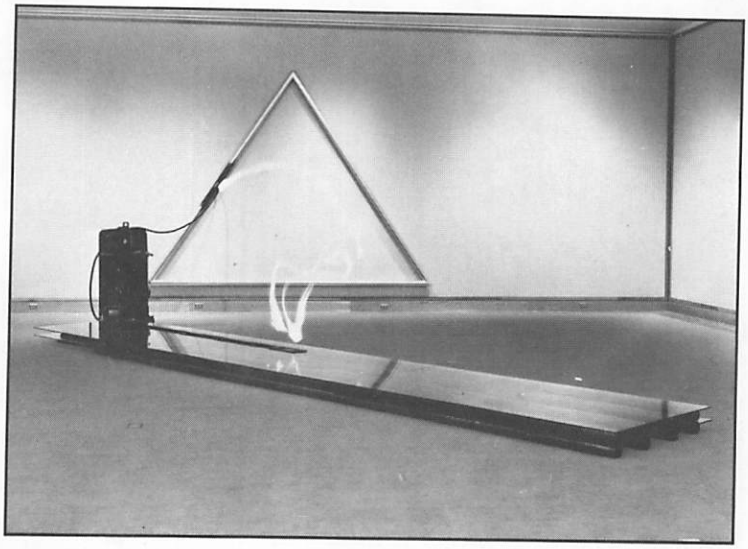

Figure 3. The Arc

Figure 4, called "Alchemic Voyage," was shown at the International Gallery of Contemporary Art in October and November of 1988. Spontaneity to materials is important to Felker as it has to do with a certain alchemistic approach to a resolution. He uses alchemy in the sense of drawing chemistry out of the environment to create a statement. Germano Celant has said much the same thing about Art Povera artists: "The artist-alchemist organizes living and vegetable matter into magic things, working to discover the root of things, in order to refind them and extol them."[9]

Objects trigger responses for Felker. They are springboards for ideas. When he finds an object that is particularly intriguing, he will not use it in its raw sense, but will create something that will take it beyond its actual existence in some way. The concept must be much stronger than what the materials indicate.

This philosophy compares with the concepts of the German artist, Joseph Beuys. He believed that the materials of his sculpture were intended as a vehicle for the meaning and understanding of our lives and that his objects would stimulate our concepts of what sculpture is and can be. Sculpture could extend to everything we do in life—think, talk, teach, mould and shape our societies. Beuys believed that sculpture was an evolutionary process in which everyone was a artist.[10]

Beuys understood that there are links between our experiences and the properties of the material itself. An example of this was his 1969 sculpture called "The Pack,"

which a herd of 20 sleds poured out of the back of a Volkswagen bus. The sleds related a primitive means of movement to insure survival in situation of need or disaster. ıch sled came with its own attached survival kit. They all carried a roll of felt which presented protection, a flashlight to give a sense of direction, and a lump of fat for od.[11]

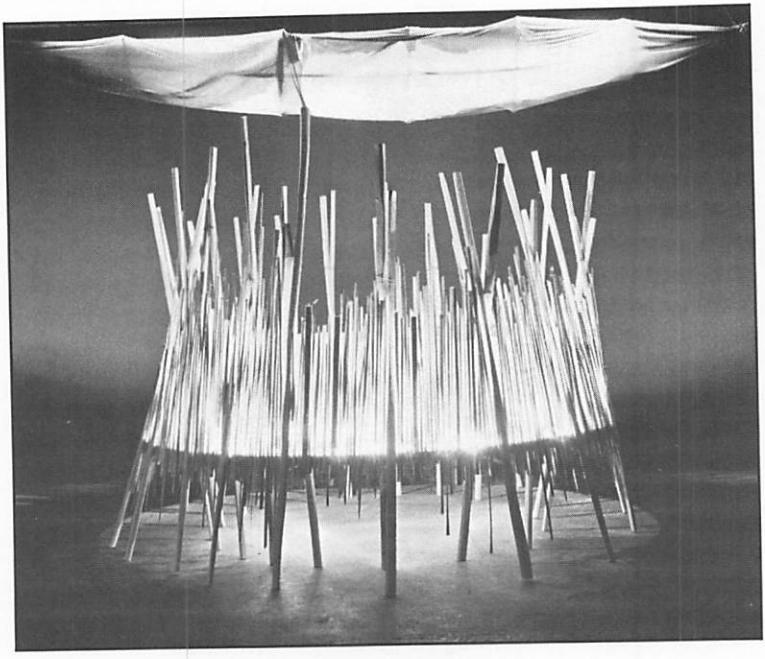

Figure 4. Alchemic Voyage

The materials of felt and fat have always been important for Beuys. He has said: 'Art expresses the realm of experience and goes far beyond the comprehensibility of ogical content."[12] The experience with felt refers to World War II in which Beuys' air- craft was shot down over Russia and the Tarters, nomads of the Cremia, saved his life. They covered his body in fat and wrapped it in felt to keep the warmth in. Caroline Tisdall, author, has related:

> It is certainly true that without the encounter with the Tarters, and with their ritualistic respect for the healing potential of materials, Beuys would never have turned to fat and felt as the material for sculpture. But this does not mean that fat and felt refer directly to the nomads, or simply to this experience of coming back to life from a state of near-death. That state and the properties of the materials remain deeply linked in the mind, and this means that the material is imbued with meaning, and this meaning can be extended. When fat and felt eventually appear in the 1950's and 1960's they are not presented as narrative elements, nor as demonstrations of material, but as elements of a theory to do with the potential and meaning of sculpture.[13]

Joseph Beuys' theory of sculpture described the passage of everything in the world—physical, spiritual, or psychological—from a chaotic, undetermined state, characterized by warmth, to a determined or ordered state characterized as cold. Ideally a balance should be achieved. According to Tisdall:

> Fat is an ideal material for demonstrating the Theory, since it can exist as a physical example of both extremes, as a chaotic, formless and flowing liquid when warm, and as a defined and ordered solid when cold.[14]

Beuys said that people instinctively understand fat relates to inner processes and feelings.[15]

Felker narrates how he became interested in Beuys: "I originally encountered Beuys' work in a book called Avant Issues of the 70's. And here is this guy walking around fully clothed immersing himself in a swamp. I thought that this was just an amazing thing and I couldn't get any connection with him at all at that point. But I do think I connected with him intuitively. Because I became very intrigued with what Beuys' work was about. I've seen several of his exhibitions, and every time I have seen his work and found out more about it, the more I believe that there is a real parallel, a real affinity with what thinking is about within my own work. And part of it has to do with my belief that Beuys' work has to do with the human spirit.

"I do know that he was an incredible humanist—as to human rights, human freedom, the spirituality of mankind. The material he uses in every piece have a certain spirituality to them—a Zen, Taoist approach to life. Everything possesses spirit. When he creates a piece that spirit is there within the context of it. And that meaning, that intuitive understanding, is what bleeds through to the audience, and I think that is the real power of his work. And even though people may not understand his work, they do in fact read it and understand it intuitively. I'm absolutely convinced of this.

"And it's because of his philosophy and his whole understanding of the preciousness of everything within existence—whether it be good or bad; and his understanding of that, in this sort of mystical way, is the thing that I found so fascinating about him.... Although I was not aware of much of that during the time of my own work, as it was progressing and evolving, it was something that I arrived at and realized that his own work was along that same nature.

"I can't say that my work has anywhere near the power and understanding that his has, but I do see a very strong similarity. I've seen some similar works that he has created that I had done, and I had no idea he had done them. And I find it very hard to compare myself to Beuys, but I do believe that he is going to be the major artist of this century."[16]

ENDNOTES

[1]Germano Celant, Art Povera (New York: Washington, Praeger Publishers, 1969), 225, 8, 105, 62.

[2]Lucy R. Lippard, Eva Hesse (New York: New York University Press, 1976), 134-135.

[3]Celant, 7, 21.

[4]Ibid., 8, 94.

[5]Ibid., 12, 224.

[6]Germano Celant, The European Iceberg: Creativity in Germany and Italy Today (New York: Rizzoli International Publication, Inc., 1985) 56, 116-117, 128-129, 138-139, 326-327.

[7]Ron Glowen, "Meditations on Cultural Enigmas," Artweek, 6 (February 1988), "Exhibitions" sec., 7.

[8]Kim Rich, "Gallery Owner Doesn't Paint a Pretty Picture", Anchorage Daily News, 14 August 1988, p. H-1.

[9]Celant, Art Povera, 225.

[10]Caroline Tisdall, Joseph Beuys (New York: Thames and Hudson, 1979), 6-7.

[11]Ibid., 190-192.

[12]Joseph Beuys, Multiples (New York: New York University Press, 1980). Sec. on "Questions to Joseph Beuys", Part II, June 1977.

[13]Tisdall, 16-17.

[14]Ibid., 72.

[15]Ibid., 72.

[16]David Felker, Interview by author, April, 1989, Anchorage.

TOPOISOMERASES IN SV40 INFECTED TC7 CELLS

Robin Rainwater

INTRODUCTION

The understanding of the mechanisms controlling both transcription and replication of DNA is an area of active investigation in the field of molecular biology. The topology of the chromatin has been implicated in the control of gene expression in eukaryotic cells, and it is thought that localized changes in the topology can preferentially turn genes on and off depending on the particular needs of the cell. Enzymes involved in bringing about these topological changes are called topoisomerases. They alter the topological state of the DNA by nicking and resealing either one strand (Type I topoisomerase) or both strands of the DNA simultaneously (Type II topoisomerase).[1] The purpose of the research project described in this paper was to determine the subcellular localization of these enzymes in SV40 infected TC7 cells.

BACKGROUND

SV40 is a DNA tumor virus that was first identified in the 1960's when it was shown to be an endogenous virus of African green monkey cells being used in the production of the poliomyelitis vaccine. It consists of only a protein icosohedral capsid and a central core of DNA. SV40 DNA is composed of 5243 base pairs with a molecular weight of 3.5 million daltons and is in the form of a covalently closed circle which is in turn twisted upon itself in what are called right-handed or negative supercoils. This topological state of the SV40 DNA is called Form I. The breaking of one phosphodiester bond in this molecule leads to the formation of Form II DNA which is relaxed due to the absence of supercoils.

In relaxed SV40 DNA one strand crossed over the other approximately 500 times with this phenomenon being described as the linking number. In Form I DNA, however, the linking number has been reduced to 475. This underwinding of the DNA puts a strain on the molecule which is relieved by the DNA curling up on itself to produce the aforementioned supercoils. When SV40 is in permissive cells where DNA replication can occur, its DNA is wound around histone octamers to form the nucleosomes of a minichromosome. If the histones are removed, the DNA follows a path that generates approximately one negative supercoil per nucleosome that is dismantled, resulting in the formation of 25-26 such negative supercoils.[2]

The replication of SV40 DNA results in the production of new molecules that are ultimately packages into virions which are released from the infected cell upon lysis. Control of replication is regulated to a large extent by large T antigen, one of the early viral proteins produced during lytic infection of permissive cells such as the TC7 monkey

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Robin Rainwater's paper was written for Biology 697, "Graduate Research," Kris Mann, Professor, UAA Biology Department.

kidney cell line. Production of T antigen begins approximately 10 to 12 hours post infection with viral DNA replication starting by 12 to 15 hours post infection. Late viral proteins used in the synthesis of the capsid begin to appear about 20 to 25 hours post infection with their production continuing up to 60 to 70 hours post infection. Up to one million mature virions can be produced per TC7 cell, and upon lysis of the cell these particles can go on to infect other cells.

The bidirectional mode of replication of closed, circular DNA, such as is present in SV40, presents a topological problem first noticed by Cairns in 1963.[3] In order to replicate, strand separation must take place which causes the loss of negative supercoils with the concomitant introduction of positive ones. This situation is energetically unfavored by the molecule, and the strain induced by the positive supercoils must be reduced or the replication forks cannot proceed, and replication will be prematurely halted. Cairns reasoned that if a transient nick was introduced into one strand of the double stranded DNA, this nicked strand could rotate around the other one, and the strain or tension could be reduced. This nicking/rotating action results in the linking number being changed leading to the production of topological isomers, DNA molecules that differ from each other only in linking number. The separation of the newly synthesized DNA duplexes presents an additional problem. These strands are wrapped around each other in such a manner as to make separation impossible unless one or both of the strands are nicked in some manner.[4]

The term topoisomerase is now used to describe enzymes capable of changing the topological state of the DNA (be it twisted, tangled, or knotted) to a form that allows the strand separation needed for either replication or transcription. Topoisomerases, no matter what their source, use the same basic mechanism—that is the DNA is broken temporarily and another segment of DNA is passed through the break before it is rejoined.[5] Two types of topoisomerases have been identified: Type I topoisomerases which cuts single strands of DNA, i.e. in double stranded DNA only one strand is cut and Type II topoisomerases which cut both strands of the DNA simultaneously. These enzymes have been identified in both prokaryotic and eukaryotic cells and while their function is the same, i.e. nicking and resealing the DNA, the means to accomplish this varies. Prokaryotic topoisomerase I is capable of releasing negatively supercoiled DNA with great efficiency, but cannot act on positively supercoiled DNA. Eukaryotic topoisomerase I can relax both types of supercoils. Prokaryotic topoisomerase I functions by covalently attaching itself to the 5′ phosphate end of the nicked DNA as opposed to eukaryotic topoisomerase I that binds to the 3′ phosphate end. The enzyme-DNA complex rotates one time relieving one supercoil and changing the linkage number by one. No input of energy is required in the action of either of these enzymes.[6] Type II topoisomerases have been characterized in both prokaryotes and eukaryotes. Both of these are capable of relaxing positive and negative supercoils in a manner that is ATP dependent, using approximately 1 ATP per event. Due to the fact that both strands of the DNA are nicked simultaneously, the linking number is changed by the factor of 2.[7]

Understanding the involvement of topoisomerases in SV40 replication has been an area of intense investigation, and both types of enzymes have been shown to function during this process.[8] In particular, evidence indicates that topoisomerase I can support the entire replicative process up to but not including the decatenation of the newly synthesized daughter duplexes. This process must be completed by topoisomerase II.[9]

The subcellular localization to topoisomerase I and topoisomerase II in SV40

infected TC7 cells has not been documented. The localization of large T antigen in such cells, however, has been characterized and it is known that the majority of T antigen is in the nucleus either attached to the nuclear matrix, associated with the chromatin, or free in the nucleoplasm. Levels of this protein increase in both the nuclear matrix and in association with the chromatin with the onset of viral DNA replication.[10] Topoisomerase I has been shown to be associated with nucleosomes in uninfected cells whereas topoisomerase II is associated with mitotic chromosome scaffolds[11] and the nuclear matrix.[12] Because topoisomerase I and II are needed to produce viable daughter SV40 DNA duplexes, it was of interest to localize both of these enzymes in subcellular compartments as well as to study their concentration in SV40 infected TC7 cells.

METHODS AND RESULTS: PART I

Because topoisomerases have the ability to both nick and ligate the DNA, my initial experiments involved determining if antibodies against topoisomerase II would recognize any other proteins with similar functions. Only topoisomerase II antibodies were used for these first experiments as anti-topoisomerase I antibodies were not available.

Two sets of the proteins to be tested were loaded onto an SDS-polyacrylamide gel and electrophoresed along with radioactive marker proteins, used to determine the molecular weight of proteins of interest. Following electrophoresis the proteins were transferred via Western blotting to nitrocellulose sheets (NCs) and subjected to either antibody treatment or stained with collodial gold total protein stain. The rabbit anti-human topoisomerase II antibodies used throughout this project were kindly provided by Dr. Leroy Liu of Johns Hopkins University.

Initial results indicated that the anti-topoisomerase II antibodies recognized several proteins: DNA ligase, Klenow fragment, and SV40 large T antigen, with both the ligase and the Klenow fragment being recognized more strongly than T antigen, DNA ligase catalyzes the joining of DNA chains that are part of double stranded, helical DNA. It has been thought that ligase functions by forming a covalent complex between the enzyme and adenosine monophosphate (AMP). The AMP is bound to the enzyme via a lysine residue and activates the phosphate at the 5′ end of the DNA so that a phosphodiester bond is formed between the 3′ hydroxyl end of one DNA strand and the 5′ phosphate end of the other. The AMP is then released. The ligase itself does not form a covalent bond with the DNA directly.

It has previously been shown that ligase taken from *E.coli* can actually relax a supercoiled DNA substrate, again in the presence of AMP in what is called the "reverse reaction" of ligation.[13] Recently evidence has been presented that T4 ligase taken from T4 bacteriaphage-infected *E.coli*, behaves like AMP dependent topoisomerases in that it relaxes negatively supercoiled DNA in a stepwise manner. Positively supercoiled DNA can also be relaxed by the enzyme. These two processes are dependent on the presence of both AMP and Mg++ and likewise are inhibited by pyrophosphate and ATP. Ligase appears to require AMP and Mg++ to relax the DNA while ATP is required for the ligation process. To change the topological state DNA ligase, like DNA topoisomerases, must break the DNA sugar phosphate backbone of at least one strand. However, unlike with topoisomerases, no evidence for the existence of a covalent bond between DNA ligase and the DNA itself has accumulated at this time.[14]

Klenow fragment is a 76 kilodalton fragment of DNA polymerase I from *E.coli*.

It has both 5′ to 3′ polymerizing activity, and 3′ to 5′ exonuclease activity which allows it to remove bases one at a time from the 3′ end of the DNA. Both ligase and Klenow fragment catalyze bond formation between the 3′ hydroxyl and 5′ phosphate end of the DNA. Likewise prokaryotic topoisomerase I and both prokaryotic and eukaryotic topoisomerase II act by binding to the 5′ phosphate of the DNA.

T antigen, weakly identified by anti-topoisomerase II antibodies, is a multifunctional protein that has been shown to be glycosylated and phosphorylated, as well as adenylated.[15] It is also an ATPase and a helicase. It is of interest that the anti-topoisomerase II antibodies used throughout this project were raised against the carboxy terminus of recombinant human topoisomerase II. Perhaps this region of the molecule consists of only the ligating function of the enzyme, not the nicking one. This then suggests that the antibody is perhaps recognizing the ligating domains of both DNA ligase and the Klenow fragment, and recognizes T antigen only weakly because there is less homology with its ligating domain. Several reasons could account for this: 1) The purified T antigen used in this experiment is not of the subpopulation that is involved primarily in the ligating reaction. 2) T antigen could be bound to the nitrocellulose in such a way that the correct antigenic determinant—the ligating one—is not exposed and, therefore, can't bind the antibody. 3) T antigen was only detected by non-specific binding of the antibody. These possibilities need to be investigated further.

METHODS AND RESULTS: PART II

Identification of the subcellular location of topoisomerases in both uninfected and SV40 infected TC7 cells is of importance to understanding the role these enzymes play in both DNA transcription and replication. It is also of interest to follow the concentration of these enzymes throughout the infection process to determine if their level increases during lytic infection as might be expected if they play a vital role in strand separation and decatenation of daughter duplexes.

Two plates of TC7 cells, not quite at monolayer, were infected with SV40 virus while two other plates of these same cells received mock infection. The infection was allowed to proceed for 41 hours at which time a side by side nuclear matrix harvest was carried out, resulting in the following fractions: 1) NP-40, 2) DNase, 3) 2M NaCl, 4) 1XRIPA, 5) 3% SDS. Fractions 4 and 5 are referred to as the nuclear matrix fractions. Two sets of each of the extracts were loaded on an SDS polyacrylamide gel and electrophoresed. The proteins were transferred by Western blotting to nitrocellulose sheets to be subjected to either antibody treatment or colloidal gold total protein stain. This process was carried out twice as the fractions were to be treated with either rabbit anti-human topoisomerase II or human anti-topoisomerase I that was obtained commercially.

Staining profiles showed a definite increase in total protein concentration in the fractions obtained from the SV40 infected cells when compared to these same fractions from uninfected cells. Initial immunodetection with anti-topoisomerase I antibodies identified the majority of the protein in the 2M NaCl fraction, indicating an association of the protein with the chromatin. Four bands, ranging in molecular weight from 67 kD to 100 kD, were detected in both the infected and uninfected extracts with the concentration being greater in the extracts from the SV40 infected cells. The nuclear matrix fraction from both sets of extracts also show the presence of these proteins, but their concentration is greatly reduced compared to that found in the 2M NaCl fraction.

Treatment with anti-topoisomerase II antibodies detected the presence of 4 protein bands in the 2M NaCl fraction from the SV40 infected cells. These proteins ranged in molecular weight from 137 kD to 167 kD. Uninfected cells did not contain any of the 4 proteins in the 2M NaCl extract, and neither set of extracts contained these proteins in the nuclear matrix fractions.

These same two sets of nuclear matrix harvest fractions were also subjected to a third immunodetection probe using PAb416 monoclonal antibodies against T antigen. Purified T antigen was run on the gel as a marker. Three molecular weight forms of T antigen were detected in this experiment with the lower molecular weight form being present in the greatest concentration. In addition the majority of T antigen was found in the NP-40 fraction with lesser amounts being present in the other fractions.

To determine if there was any significant change in concentration of the topoisomerases during the infection, a time course study was carried out. Two sets of plates of TC7 cells were set up. One set was infected with SV40 virus with the other set receiving a mock infection. 1XRIPA total protein harvests were carried out on one plate from each set at 0, 10, 23, 34, and 46 hours post infection. Protein extracts were again run on a gel, blotted to nitrocellulose, and treated with antibody by the aforementioned protocol. Treatment with anti-topoisomerase I antibodies showed no significant difference in the amount of topoisomerase I in the SV40 infected TC7 fractions when compared to fractions taken from uninfected cells. Levels of topoisomerase I appear to remain fairly constant throughout the infection in extracts taken from SV40 infected cells.

Time course fraction treated with anti-topoisomerase II antibodies indicate a significant increase in concentration of these 4 proteins as the SV40 infection progresses, particularly at the 34- and 46-hour time points. Tracks from uninfected cells show a significantly lower concentration of topoisomerase II proteins with a further decrease in concentration to a barely detectable level by 46 hours post infection.

Treatment of these same 1XRIPA fractions with PAb416 monoclonal antibodies detected the production of high molecular weight T antigen 23 hours post infection. As the infection progressed two additional lower molecular weight forms also become detectable, but at a lower concentration. Because three different forms of T antigen were identified, it was hypothesized that the protein was perhaps changing form and thus molecular weight with time. In order to determine whether this represented normal turnover of T antigen or breakdown of the protein, another protocol was used. A side-by-side infection of two plates of TC7 cells was carried out. Two hours prior to harvest the culture medium from one plate was removed and new medium lacking methionine was added. At the same time ^{35}S methionine was added. Thus all the methionine containing proteins synthesized during the 2-hour labelling time would be radioactive. The second plate received a similar treatment except that complete, non-radioactive medium was used. The nuclear matrix harvest procedure was then carried out as previously described.

Immunoprecipitation was used to remove newly synthesized T antigen from each of the fractions. In this procedure aliquots of each fraction were treated with PAb416 for 2 hours on ice. PAb416 will preferentially bind T antigen, and subsequent treatment with Protein A will remove these antigen-antibody complexes from each fraction. The immunoprecipitates (IPs) were then subjected to SDS polyacrylamide gel electrophoresis. The gel was treated with dimethylsulfoxide (DMSO) overnight, and then with DMSO-PPO the following day to impregnate it with PPO used to enhance the detection of radio-

actively labelled proteins such as ^{35}S labelled T antigen. Finally the impregnated gel was dried down on filter paper and placed against a preflashed film at -80°C.

The profile of the PAb416 IPs clearly shows the presence of only one T antigen band in each track, and this band is of the higher molecular weight form. The unlabeled fractions from this same experiment were also run on a gel, blotted to nitrocellulose, and treated with PAb416. The anti-T antigen profile of these fractions contains three separate bands of T antigen with the lower molecular weight form being present in the highest concentration. These latter fractions are a measurement of total T antigen produced throughout the infection while the immunoprecipitates represent newly synthesized T produced during the 2-hour labeling period. Previously done pulse-chase studies (Personal communication from K. Mann) over a 12-hour period have also detected the presence of only the higher molecular weight form of T antigen in immunoprecipitates. Therefore, if T is turning over to a lower molecular weight form, it is occurring at some time beyond the first 12 hours after its initial synthesis.

CONCLUSION

From the results just presented several conclusions can be reached. First, preferential localization of topoisomerase I and II in the high salt fractions from SV40 infected cells indicates that these enzymes are in some way associated with the chromatin prior to extraction. Second, topoisomerase I also seems to be associated with the nuclear matrix as is indicated by its presence in the 1XRIPA and 3% SDS fractions. Topoisomerase II has no such association. Third, topoisomerase I maintains a fairly constant concentration in both uninfected and SV40 infected cells, while topoisomerase II shows a definite increase in concentration in SV40 infected cells during the latter part of the infection. This change could be the result of one or both of the following: An actual increase in topoisomerase II in SV40 infected cells compared to uninfected cells or a decrease in its concentration in uninfected cells compared to infected cells.

The constant level of topoisomerase I may be indicative of the functional role it plays in both of these systems. Topoisomerase I is capable of changing the topology of the DNA so that transcription and/or replication can take place. Since both infected and uninfected cells are undertaking these processes, each would require the presence of this enzyme. High levels of topoisomerase I in uninfected cells may be indicative of its active role in transcription and/or replication, and enough may be present in the cells to accommodate even the increased needs brought about by SV40 infection.

Topoisomerase II is of particular interest because it appears to be greatly increased in SV40 infected TC7 cells at the time of harvest. In addition, its association with the chromatin in infected cells, as indicated by its presence in the 2M NaCl fraction, is perhaps an implication of its important function—the decatenation of newly synthesized DNA molecules. Likewise, its lower concentration in the uninfected cells may be due to the fact that these cells had reached monolayer at the time of harvest and were no longer dividing. With DNA replication essentially halted, topoisomerase II is no longer needed at elevated levels. The SV40 infected cells, however, are centers of active viral DNA production, and as such, would need topoisomerase II to decatenate the newly synthesized daughter duplexes. It has previously been shown that an increase in topoisomerase II is a specific marker for proliferation in uninfected cells, and when active proliferation stops, the level of this enzyme decreases.[16] It is therefore possible

that the increase in topoisomerase II found in SV40 infected TC7 cells could be used as a similar marker, indicating an active viral infection.

Finally, the suggested turnover of T antigen may be associated with the different roles this protein plays during the lytic cycle, or it may simply be due to the breakdown of T with time. It seems most likely, however, that the conversion of T antigen from a high molecular weight form to a lower one is the result of the extraction procedure itself. Newly synthesized high molecular weight T seems to be resistant to this process while the older high molecular weight form seems to be preferentially converted as a result of the nuclear matrix extraction procedure.

In conclusion it appears that topoisomerase I seems to maintain a fairly constant level of concentration throughout the SV40 infection of TC7 cells. Topoisomerase II, on the other hand, shows a clear increase in concentration as the infection proceeds with this increase having the potential to serve as a indicator of an active infection.

ENDNOTES

[1]James C. Wang, "DNA Topoisomerases," Ann. Rev. Biochem, 54 (1985): 665-697.

[2]Christine Ambrose, Russell McLaughlin, Minou Bina, "The Flexibility and Topology of Simian Virus 40 DNA in Minichromosomes," Nucleic Acids Research 15 (1987): 3703-3721.

[3]John Tooze, DNA Tumor Viruses, 2nd Ed., (New York: Cold Spring Harbor Laboratory, 1981): 152-156.

[4]Ibid.

[5]Wang, Ibid.

[6]Ibid.

[7]Liu Yang, Thomas C. Rowe, Eric M. Nelson, Leroy F. Liu, "In Vivo Mapping of DNA Topoisomerase II-Specific Cleavage Sites on SV40 Chromatin," Cell 41 (1985): 127-132.

[8]Marc S. Wold, David H. Weinberg, David M. Virshup, Joachim J. Li, Thomas J. Kelly, "Identification of Cellular Proteins Required for Simiam Virus 40 DNA Replication," J. of Biol. Chem. 264 (1989): 2801-2809.

[9]Liu Yang, Marc S. Wold, Joachim J. Li, Thomas J. Kelly, Leroy F. Liu, "Roles of DNA Topoisomerases in Simian Virus 40 DNA Replication in Vitro," Proc. Natl. Acad. Sci. 84 (1987): 950-954.

[10]Reinhold Schirmbeck, Wolfgang Deppert, "Specific Interaction of Simian Virus 40 Large T Antigen with Cellular Chromatin and Nuclear Matrix During the Course of Infection," J. of Virology. 61 (1987): 3561-3569.

[11]William C. Earnshaw, Margaret M. S. Heck, "Localization of Topoisomerase II in Mitotic Chromosomes," J. of Cell Biol. 100 (1985): 1716-1725.

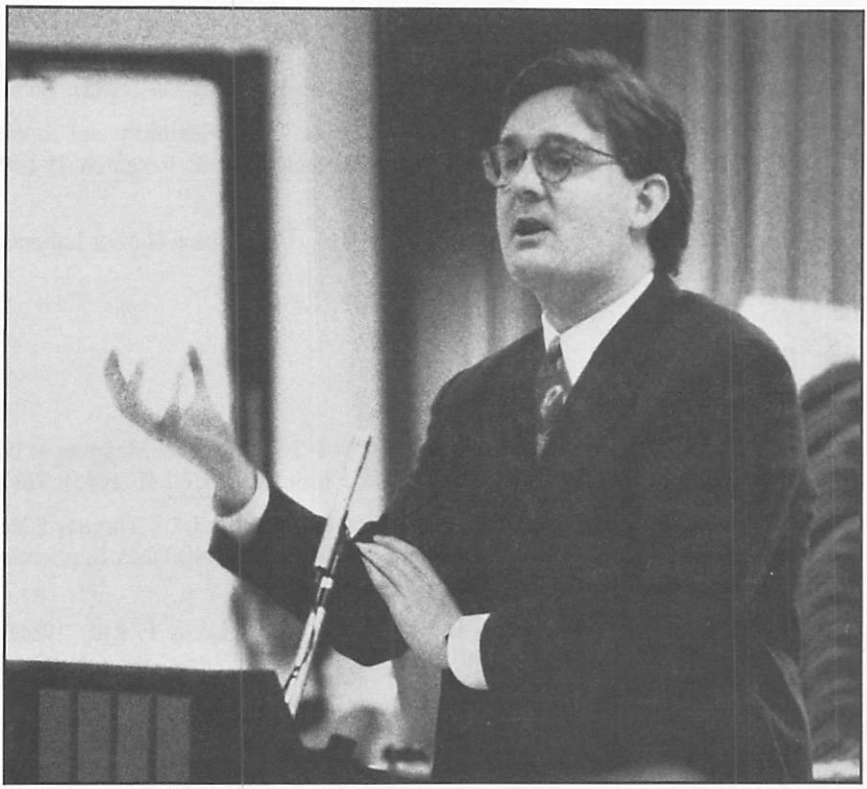
[12]Michael Berrios, N. Osheroff, P. A. Fisher, "In Situ Localization of DNA Topoisomerase II, a Major Polypeptide Component of the Drosophila Nuclear Matrix Fraction," Proc. Natl. Acad. Sci. 82 (1985): 4142-4146.

[13]Alessandra Montecucco, Giovanni Ciarrocchi, "AMP-Dependent DNA Relaxation Catalyzed by DNA Ligase Occurs by a Nicking-Closing Mechanism," Nucleic Acids Research 16 (1988): 7369-7381.

[14]Ibid.

[15]David M. Livingston, Margaret K. Bradley, "The Simiam Virus 40 Large T Antigen—A Lot Packed into a Little," Mol. Biol. Med. 4 (1987): 63-80.

[16]Margaret M. S. Heck, William C. Earnshaw, "Topoisomerase II: A Specific Marker of Cell Proliferation," J. of Cell Biol. 103 (1986): 2569-2581.



Gregory Carr addresses students at Showcase luncheon.

PROMPTING BAR PATRONS WITH SIGNS TO TAKE FREE CONDOMS

Tammy Jo Honnen

Abstract

This study was designed to determine if signs with the State of Alaska statistics for AIDS, could prompt bar patrons to avail themselves of free condoms at an increased rate. The study was conducted in three gay bars in Anchorage, Alaska over an eight-week period. All three bars had a container of free condoms in an accessible location. The treatment used in this study included placing a large sign directly above the container of condoms which gave statistics on the number of people who have died from AIDS in the state. The sign also noted condoms can reduce the spread of AIDS. During treatment phases, additional signs placed in the restrooms provided information about safe sex practices and reminded patrons free condoms could be obtained at a given location in the bar. An ABAB design was employed with a 2-week baseline, 2-week treatment with signs present, 2-week reversal with no signs, and 2-week reinstatement of treatment with signs present. With data from all three bars combined, 748 condoms were taken with signs present and 510 condoms were taken with signs absent ($x^2(1)=22.5$, $p < .001$). When signs were present, the number of condoms taken was increased by 47%. Given their low cost, it is concluded signs are of significant value in prompting bar patrons to take free condoms.

In the absence of cure for AIDS, our greatest hope for fighting this dreaded disease is prevention.[1] Toward this end, researchers have attempted to isolate variables predicting people's willingness to engage in safe sexual behavior.[2] Barring monogamy and celibacy which are not widely utilized,[3] using condoms is the most effective preventative practice to guard against sexual transmission of AIDS.[4]

Due to the importance of using condoms as an AIDS prevention behavior, it is a high priority to increase their use particularly among people in high-risk populations. Therefore, marketing strategies have been developed to increase people's willingness to use condoms.[5] Other efforts have focused on education.

Education is an important component of prevention programs.[6] People need to know the health risks of their current behaviors and be aware of safer alternatives. However, education alone is not sufficient to promote reliable changes in sexual behaviors.[7] Preventive sex practices are influenced by social norms,[8] feelings of personal efficacy,[9] and beliefs about health.[10] Preventive sex practices are also affected by environmental contingencies.

Tammy Jo Honnen's paper was written for Psychology 420, "Research Methods," Bruno Kappes and Chris Kleinke, Professors, UAA Psychology Department.

The purpose of the present study was to determine whether a simple environmental manipulation, prompting with signs, would influence people to take free condoms at an increased rate. The study was conducted in gay bars because gay and bisexual men are at high risk for contracting AIDS.[11] Further, alcohol use is associated with the increased high-risk sexual activity.[12] Prior to this study, free condoms and educational pamphlets were available in the bars chosen for participation.

METHOD

Procedure

The experiment was conducted in three gay bars in Anchorage, Alaska. An ABAB design was employed, with a 2-week baseline, and 2-week treatment with signs present, 2-week reversal, and 2-week reinstatement of treatment. The dependent variable was the number of free condoms taken from the container adjacent to the bar where customers purchase drinks. Data was always collected at the same time and day of the week.

Signs

A 12" x 24" sign was placed above the container of condoms during the treatment periods. The sign stated how many people have died from AIDS in Alaska and informed readers that condoms can reduce the spread of AIDS. Additional signs were placed in the restrooms during treatment periods. These contained safe sex guidelines including the use of condoms, and reminded patrons free condoms were available at a given location in the bar. The signs were designed to help customers appreciate their risk of contracting AIDS[13] without using a fear appeal strong enough to cause denial.[14]

RESULTS

Data from the three bars combined are displayed in Figure 1. Results were analyzed by comparing the two time periods when signs were present with the two time periods when the signs were absent. In Bar 1, 275 condoms were taken with the signs present and 139 condoms were taken with signs absent ($x^2(1)=44.6$, $p < .001$). In Bar 2, 246 condoms were taken with signs present and 228 condoms were taken with the signs absent ($x^2(1)=.68$, ns). In Bar 3, 227 condoms were taken with signs present and 143 condoms were taken with signs absent ($x^2(1)=19.1$, $p < .001$). With data from all bars combined, 748 condoms were taken with signs present and 510 condoms were taken with signs absent ($x^2(1)=22.5$, $p < .001$). For all bars combined, the signs resulted in a 47% increase in the number of condoms taken.

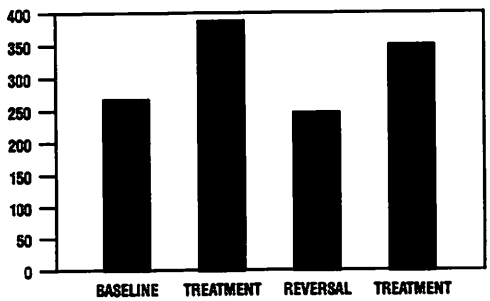


Figure 1. Number of condoms taken from all locations during each phase.

DISCUSSION

This study suggests preventive sex practices can be affected by environmental prompts or contingencies. Further, the signs fulfilled three requirements for the effectiveness of fear appeals: (a) reminding patrons AIDS is a major disease, (b) making them attentive to their vulnerability, and (c) recommending condoms as an effective threat-reducing action.[15] This study also satisfied two common problems in AIDS-prevention research: gaining access to high-risk population and obtaining a behavioral measure.[16] The intervention and data collection were unobtrusive and nonreactive.[17]

It is possible the signs were more effective in Bar 1 and Bar 3 because of the availability of well-lighted locations for their placement. Because free condoms and educational pamphlets were available prior to the study, it would appear the signs functioned in a prompting capacity rather than simply educational. Since the free condoms were taken by bar patrons out of their own volition, we assume they were used for their intended purpose. Given the negligible cost of signs and the deadly consequences of AIDS, a 47% increase in use of condoms is significant.

ENDNOTES

[1]A. Baum, & Nesselhof, "Psychological Research and the Prevention, Etiology, and Treatment of AIDS," American Psychologist, 43, (1988): 900-906; G. Caplan, Principles of Preventive Psychiatry, (New York: Basic Books, 1964); S. F. Morin, "AIDS: The Challenge to Psychology," American Psychologist, 43, (1988): 838-842.

[2]C. A. Emmons, J. G. Joseph, R. C. Kessley, C. B. Wortman, S. B. Montgomery & D. G. Ostrow, "Psychosocial Predictors of Reported Behavior Change in Homosexual Men at Risk for AIDS," Health Education Quarterly, 4, (1986): 331-345.

[3]J. L. Martin, "AIDS Risk Reduction Recommendation and Sexual Behavior Patterns Among Gay Men: A Multifactorial Categorical Approach to Assessing Change," Health Education Quarterly, 4, (1986): 347-359.

[4]E. C. Koop, Surgeon General's Report on: Acquired Immune Deficiency Syndrome, U.S. Department of Health and Social Services, (Washington, D.C.: U.S. Government Printing Office, 1987).

[5]M. Z. Solomon & W. DeJong, "Recent Sexually Transmitted Disease Prevention Efforts and Their Implications for AIDS Health Education," Health Education Quarterly, 4, (1986): 293-299.

[6]R. D. Stall, T. J. Coates & C. Hoff, "Behavioral Risk Reduction for HIV Infectio Among Gay and Bisexual Men: A Review of Results from the United States," America Psychologist, 43, (1988): 878-885.

[7]Morin, 838-842; Stall, 878-885.

[8]D. C. Des Jarlais & S. R. Griedman, "The Psychology of Preventing AIDS Am Intravenous Drug Users: A Social Learning Conceptualization," American Psycholo 43, (1988): 865-870; J. D. Fisher, "Possible Effects of Reference Group-based S Influence on AIDS-risk Behavior and AIDS Prevention," American Psychologis (1988): 914-920.

[9]Stall, 878-885.

[10]N. K. Janz & M. H. Becker, "The Health Belief Model: A Decade Later," Health Education Quarterly, 1, (1984): 1-47.

[11]W. F. Batchelor, "AIDS 1988: The Science and Limits of Science," American Psychologist, 43, (1988): 853-858.

[12]R. D. Stall, W. J. McKusick, T. J. Coates & D. G. Ostrow, "Alcohol and Drug Use During Sexual Activity and Compliance with Safe Sex Guidelines for AIDS: The AIDS Behavioral Research Project," Health Education Quarterly, 4, (1986): 359-371.

[13]L. G. Bauman, & K. Siegel, "Misperception Among Gay Men of the Risk for AIDS Associated with Their Sexual Behavior," Journal of Applied Social Psychology, 17, (1987): 329-350.

[14]H. Leventhal, "Findings and Theory in the Study of Fear Communication," Advances in Experimental Social Psychology, Ed. L. Berkowits, (New York: Academic Press, 1970); Vol. 8: 119-186.

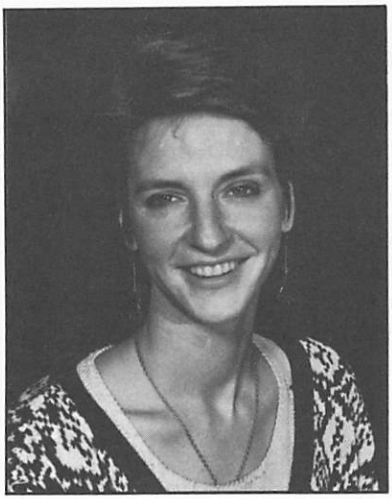
[15]R. W. Rogers, "A Protection Motivation Theory of Fear Appeals and Attitude Change," Journal of Psychology, 91, (1975): 93-114.

[16]L. S. Williams, "AIDS Risk Reduction: A Community Health Education Intervention for Minority High Risk Group Members," Health Education Quarterly, 4, (1986): 407-421.

[17]E. J. Webb, D. T. Campbell, R. D. Schwartz & L. Sechrest, Unobtrusive Measures: Nonreactive Research in the Social Sciences. (New York: Rand McNally, 1969); L. Bickman & T. Henchy, Beyond the Laboratory: Field Research in Social Psychology, eds. L. Bickman & T. Henchy (New York: McGraw-Hill, 1972), Introduction.

TELEVISION AS EDUCATION: POTENTIAL AND PRACTICE

Laurie Stewart



Thirty years ago television was the wave of the future, and was enthusiastically viewed as the answer to many of the problems facing American Education: namely, limited funds and a shortage of good teachers. But we seldom know what exactly to do with new technology once we've got it. The tendency is to try to use it in the same way as whatever technology it is replacing. Such was the case with early attempts at using television as an educational tool. A Ford Foundation report of 1959 makes some mention of exploiting the visual potential of the television medium, but the format of televised education was essentially that of the classroom lecture. One of the relatively rare "good teachers" stood in front of the camera instead of in front of a class, and the principle "visuals" of these early broadcasts was the humble chalkboard.

By 1966, a report by National Education Association entitled, "Implications for Televised Instruction," was already decrying the "talking head" format of educational programming. Among the problems they identified was the crashing dullness of the lecture format— "tell" instead of "show" —and the overdose of raw information in a medium in which verbal information is difficult to assimilate. They had by then figured out that learning requires involvement, and pointed out the need for some means of interaction between students and instructors.

Since 1966, television has become a cultural villain. Popular articles and books on the subject of television take an overwhelmingly negative view, in which television is not only seen as contributing nothing in the way of educational benefits, but that it is somehow mutually exclusive with education.

Among the myriad evils of television, according to the dominant critical viewpoint, are qualities that would, if true, seriously hinder the success of television as an educational tool. First, it is primarily a visual medium, and research indicates that audio retention of televised information is dismally low. Secondly, it is a passive medium, requiring no intellectual effort on the part of viewers. Thirdly, it simply moves too damned

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Laurie Stewart's paper was written for Journalism 416, "Information Age Communication," Doug Barry, Professor, UAA Journalism Department.

fast for processing: we have enough to do just to keep up with what we're seeing, much less to actively process it.

Wilder accusations have been made as well. In Growing up on Television: A Report To Parents, Dorothy Cohen accuses television of "throwing the species off its age-old perceptual track," not to mention lowering I.Q.'s, dissolving capacities for attention, critical thinking, and continuity of thought.[1]

The first question that must be considered if we are to look at television as an educational tool, then, is the question of whether or not it can *be* an educational tool. Can we learn from television? More specifically, can we achieve the particular kind of learning that is measurable, testable, quantifiable?

The three objections mentioned earlier to television as an educational tool are significant: television is primarily a visual medium, and images are not well-noted for their information-imparting capacity. It's also true that television viewing tends to be passive. The last objection, that television moves too fast and can't be reviewed, is rendered void with the advent of video.

As R. Moss[2] points out in his book, Video: The Educational Challenge:

> . . .the shift from broadcast television to video offers the learner far greater control of his or her learning activity; it offers availability on demand, the ability to repeat a sequence, to stop and start at will and even to hold a single frame for analysis. On the other hand, the enormous richness of the range of modes in which television can present or represent knowledge tells us nothing of itself about how (or instead 'if') the user processes that knowledge. Television, in other words, is a skilled and gifted *teacher*, able to call on an immensely wide range of resources to present an idea; we understand much less about the *learner*, that is, about how the viewer develops skills to analyze and process that knowledge presented in television format.

As this passage implies, the question of whether or not television *can* teach is relatively moot: the research evidence from the fifties forward supports the notion that it can. Televised courses work. Somehow the visual nature of the medium still permits information to be acquired, and the debatable passivity of the medium likewise doesn't prevent learning.

In the United States, telecourses have been in constant use since the early fifties, and evidence of their effectiveness is sufficiently strong that universities give the same credit for telecourses that they give for traditional classroom courses.

On the other hand, the fact that telecourses can work doesn't mean they're ideal: they have yet to seriously challenge traditional forms of instruction, except in countries where there *is* little traditional instruction—a situation of economic necessity, not choice. And the question of *how* they work, and whether or not we've even come close to reaching the outer limits of their potential, hasn't been touched.

One thing that is clear is that simply watching a television program does not constitute education. Programs alone don't work. As Patricia Greenfield[3] points out in her excellent book, Mind and Media, "Learning is impossible without active participation and mental effort, so the passivity encouraged by television must be overcome if television is to be a tool for learning."

What many television critics fail to consider is that television viewing is transformed from passive to active by the mere expedience of thinking critically about what one is viewing.

Masterman, in his book Teaching About Television, found (along with Moss and Greenfield) that if children are taught *about* television, they rapidly become astute and critical viewers, and the experience of viewing goes from unconscious and passive to conscious and active. Furthermore, they become more discriminating in what they watch, and retain more. These are not formal studies, only observations by professionals in teaching and media, but they agree with my own experiences as a student of television.[4]

A study by Ben-Moshe and Salomon found that sixth-graders who'd been trained to watch television critically and actively also showed improvement in reading comprehension scores.[5] They wrote, "there is evidence that television does interfere with reading under some circumstances, but this may happen not because of an intrinsic conflict between these two media but because the usual way of watching television is without care of effort."

In other words, the problem of passivity isn't inherent in the medium of television itself, but in the passivity of viewers who do not apply critical thinking skills to what they watch. If viewers simply let the images wash over them, it's not surprising that little of the content is retained in the form of declarative knowledge. There is likewise little retention of written material if the reader makes no attempt to retain it.

But critical viewing alone doesn't make television viewing "education" any more than does critical lecture attendance. To illustrate; one year there was a university course I wanted to take, but my course load was too heavy to obtain permission to add the class. I audited the class instead, taking notes and doing the reading, but I took the exams cold without special study. I did poorly on the exams, even though I'd earned A's on a similar exams by the same instructor in a different course. Interest, attention, and note taking were not enough. Learning requires deliberate effort and active involvement.

Greenfield writes, "The combination of television with a more involving student activity like discussion is more effective for learning than television plus lecture.... The importance of active participation by students comes up again and again in the results of research into the educational use of media."[6]

Part of the evidence Greenfield refers to is the ambitious experiment of the Nigerian government. Faced with a critical shortage of teachers, they put their money into television. While they'd originally hoped to supplement the programs with lectures by teachers, they were forced to rely mostly on assistants whose credentials consisted of a three-week crash course in leading program discussion groups. As it turned out, the assistants produced startlingly better results than did the lecturing teachers: student involvement was the key.

So much for two of our three problems with education by television: the ephemeral nature of television has been altered with the advent of videos, and the passivity of television viewing can be similarly dismissed via critical viewing skills and viewer involvement. There remains the problem of television being a primarily visual medium.

Our bias toward print is strong. But is a visual medium really so limited as to be a problem? It would not be stretching the truth to say that the human mind resembles a complicated audio-visual system. Sight and hearing are our principle sensory organs. How does television actually fare when compared to print?

A study comparing the levels of comprehension and memory for print and

television[7] found only one statistically reliable difference between print and television, and it favored television.

Greenfield writes, "we know that when children watch television, they derive more information from the visual than from the audio track. . . the predominance of the visual has disappeared with age." But audio recall deteriorates faster than visual. "Even for adults, visual memory proved to be more enduring than auditory memory."[8]

Greenfield made the point:

> . . . properly used, every medium, without exception, can provide opportunities for human learning and development. The task now is to find a niche for each medium, so that each can contribute to a creative system of multimedia education. . . . It is time to consider whether print has not, in our educational system, been assigned tasks that other media can do better.[9]

To clarify, then, our discussion of television as an educational tool should be redefined. In the first place, we're talking about video education, not television education. The difference is significant; videos are more book-like, allowing for review and personalized pacing, which dramatically enhances the educational potential.

Secondly, we're not talking about exclusively visual media. For its effectiveness, visual media require some form of augmentation, be it discussion, written or verbal elaboration and integration, and frequently supplemental texts. Audio-visual education is thus multi-media education. Again, the distinction is important: the critics of television are relatively accurate when they say that you can't "learn" (in the formal sense) just by watching the tube—anymore than you can learn just by reading a book or listening to a lecture. Learning is not a passive process.

The question becomes "for what type of learning is the multi-media approach the most valuable?" Here, we might take a hint from the qualities of television that have made it so enormously successful as a medium.

The primary use of television thus far has apparently been entertainment. For television critic Neil Postman, this is proof of the evil of television; he fears that we will come to expect, as our right, education that is also entertaining, and that television will spoil us to the point of being unwilling to engage in learning that is not also entertainment. He writes, "the problem is not that television presents us with entertaining subject matter but that all subject matter is presented as entertaining, which is another issue altogether." He continues, "television speaks in only one persistent voice—the voice of entertainment."[10]

But in terms of answering the questions of what the primary power is of television, "entertainment" is not satisfactory—even though it's the most common answer offered. It ignores the question of *why* television entertains so well.

The usual explanation for the fascination of television is the couch-potato thesis; that people are so lazy and sloth-like that they always choose the path of least effort. Television is an instantly accessible world of vicarious experience, the thesis goes, requiring nothing more of the viewers than keeping their eyelids open. From the point of view of an observer, this would seem to be the case; TV viewers can be observed to be doing nothing more than sitting and watching. (Unless the observer had ever observed *me* watching TV; passive I am not.)

Vicarious experience is generally dismissed as insignificant—mostly, I suspect, because it's not observable. In fact, the significance of vicarious experience is not understood, either in terms of television or real life. Does being physically abused, for example, cause more psychic distress than the mere vicarious experience of watching someone else—a mother or sibling—being physically abused? It seems to me unlikely that vicarious experience can be dismissed as readily as many television critics do.

In the end, the couch-potato hypothesis is not a likely explanation of television's power. For one thing, humans don't like to be bored. If television were as boring and unsatisfying and tedious as the critics paint it, it is unlikely that so many people would be so attracted to it. For hypnotic power, if that's all people want, the test pattern that appears at the beginning of the broadcast day could run all the time and be equally satisfying, without requiring the effort of producing expensive programming, or the effort of viewers in following plots.

Another popular but related thesis is the "escape" argument—that television allows us to escape the pain of our own lives by vicarious adventures in fantasy-land. But if television is valued as an escape medium, then why does it so persistently deal with tragedies and violence and the problems of real life? How do we explain the passion of audiences for the hyper-reality of soaps?

I believe the most likely candidate for the role of television's strength, far from its being vicarious stuff that leaves the self untouched, or escape from life's problems, is the extraordinary realism and real-lifeness of television. With print, we can keep our emotional and intellectual distance from the contents; with television, we can't. It is immediate, graphic, and *real*. This is not to say that it necessarily portrays reality realistically, only that whatever reality it *does* portray *seems* very real. It is this same quality that could potentially make television such a powerful force in education.

Unfortunately, that same great strength in television is the one quality most consistently lacking in educational productions.

Moss writes:

> . . .traditionally, audiences for educational programs are relatively small, which implies that their budgets are inferior to those for entertainment and that a career in this area is rarely the prime objective of an aspiring producer or director. As a result, educational broadcasting is traditionally duller than programs transmitted for larger audiences at peak viewing periods.[11]

Greenfield made a key point:

> In addition to good educational design, a program's aesthetic and creative qualities are undoubtedly important to its educational success. An attempt at educational reform using television in El Salvador had variable results depending mainly on the quality of particular programs. . .the full exploitation of television's educational potential must depend on using the art, as well as on knowing the technology, the child, the culture, and the subject matter.[12]

I don't think this constitutes proof for Postman's belief that education is now being judged by the standards of entertainment. In the first place, I don't share his apparent conviction that good education is boring, and in the second, if we obey the dictates of the form of the television medium, not to mention the dictates of good teaching, boring television will not be the result.

To take the discussion from the purely theoretical, it might be valuable to take a specific example of television learning, as it is in fact practiced by real students in the real world. Toward that end, I enrolled in a telecourse, Cultural Anthropology, offered through the University of Alaska Anchorage. It was my first telecourse, and I must admit to some bias against telecourses in general. I thought of them as the poorer cousin of regular classroom courses.

In order to widen the base of my study, I obtained permission to conduct a survey of my sixty fellow cultural anthropology students, and what follows is the results of that survey and my own impressions.

The programs that went with the course were not of the dull talking-head variety; they were unusually good. Some of the telecourses offered at UAA are still of the amateur talking-head lecture variety, and a number of them attempt to be creative productions and simply fail. The "Write Course" is a notable example. The producers attempted to use a dramatic format to "bring the subject to life," only the dramatic situations, dialogue, acting and directing are all so lame as to render the attempt absurd.

The Cultural Anthropology programs are very slick WNET productions, award-winning shows. I used to watch them for entertainment when they first came out. The music is excellent, the footage is awe-inspiring: men in New Guinea diving off a 70-foot tall platform with vines tied around their ankles to break their fall; nomadic tribesmen sliding down avalanches in the mountains, with sheep tumbling off cliffs; a father begging his third world son not to abandon the village for the big city.

I laughed, I cried, I winced, I sat on the edge of my chair. The entire purpose of a course in anthropology is to show that, great cultural differences notwithstanding, we are not that different from other peoples. The programs made that point in a way that I don't believe any text could. I was *there*. I saw things I'd only read about, and seeing changed the whole complexion of the stuff. It was impossible to look at these people and not feel an identification with their humanity, whereas it *is* possible to read about them and be aware only of their "primitiveness."

In short, these programs were an excellent example of education harnessing the strengths of the television medium. But as we have already discussed, just watching a program—no matter how excellent—doesn't constitute education. How did the course format address such aspects as active vs. passive participation, student involvement and interaction? What demands were placed on the learners? How was the video viewing integrated into the course?

The programs in this course were not intended to stand alone: also required was reading in the companion text, a viewer's guide, pointing out elements to watch for, and including "discussion questions" (although there was no discussion). There was also a supplemental book, a case-study of one of the cultures discussed in the text and programs. The telecourse office provided a 70-page sheaf of papers for the course, which included a letter of greeting from the instructor, a tentative exam schedule, the television broadcast schedule, video-viewing locations, and instructions for turning in assignments. There was also a detailed course outline, a lesson plan and checklist, a calendar for

planning course work, ten quizzes (two pages each) to be mailed in, and six articles from which to choose subjects for two required and two optional written assignments.

One of the immediate problems was the effort of wading through so much material to find answers to questions, and in one particularly irritating oversight, there was no listing of due dates for assignments, so I never knew if I was turning in my work on schedule or not. While there had obviously been an attempt to organize the material in a structured way, there remains much room for improvement, as other students also noted.

The only active effort required of students were the quizzes and exams, whose questions were lifted almost verbatim from the text, and the written assignments—two pages minimum on subjects like the comparison of two different theoretical approaches in cultural anthropology.

Ideally, the instructor was supposed to receive assignments on a regular basis, grade them and return them by mail. In practice most students did what I did—race through three or four assignments all at once, and deluge the instructor with them at the last moment.

The only contact with the instructor was over the phone, stopping by his office, attendance at the three voluntary meetings during the semester, and smiling faces on your quizzes if you got all the answers right. The instructor also had some opportunity to get to know individual students via our written assignments, on which he wrote copious comments. Contact with fellow students was limited to, again, the voluntary meetings, which pulled in a quarter to a third of the classmates, and two exams which were held in a gymnasium, at a local school, and were administered to all telecourse students at the same time.

While none of the course work was particularly difficult, as is typical of a sophomore level course, many students detested the written assignments, and nearly all made reference to the unusual demands on self-discipline. The profile of the typical student in this course was consistent with that of the university in general: the mean age as 28 years, 80% were degree-seeking students, half of them full-time. They were not rural students, then, as might be expected in Alaska, but Anchorage-dwelling experienced college students who were for various reasons, supplementing regular courses with telecourses.

Of those students responding, 25% were taking the class because regular courses were full; 50% needed the course for degree requirements; 75% chose telecourses for the flexibility because they couldn't work a regular classroom course into their schedules; and 25% said they took the course because they like telecourses, although only 4% had previously taken telecourses. Another 45% said they were curious about what telecourses were like, 28% said they were curious about cultural anthropology, and 26% thought a telecourse would be less demanding than a regular course. Among the miscellaneous responses, one student noted that she needed visual aids to do well in a course.

One of the frequently observed characteristics of successful telecourse students is strong self-motivation and self-discipline, so I asked students to rate themselves in these two areas. Over half, 54% described themselves as "highly motivated," 28% as having average motivation, and one student described herself as particularly motivated, pencilling in the margin, "burned out." Only 26% described themselves as highly disciplined, 60% as having average discipline, and the same burned-out student coming

in again with the sole "not particularly disciplined."

There was almost no relation between these self-ratings and performance. Only 11% of all students said they'd kept ahead of schedule in the work and reading, and none of these had described themselves as "highly disciplined." Of those responding, 48% were "behind most of the time," with another 40% claiming to have kept right on schedule. There was likewise little relation between students' estimates of how well they'd kept to the schedule and the instructor's estimate on the same point; he reported that nearly all students were chronically late turning in their work.

Students were also asked how they had made use of the materials for the course, and the relative value they would assign to each. I had found that I didn't need all the materials provided for the course in order to do well, and to meet my own educational goals. I was curious to see if other students had also "cheated," so I could measure that against actual performance and the relative value of different elements of this mixed-media course approach.

Only 54% did all the required reading, and only the same percentage viewed all the programs. (While I have no figures, I suspect this isn't so different from what students in regular classroom courses might report.) Only 32% bothered with the viewer's guide, and about 58% did the reading in the supplemental text. Not surprisingly, there was a strong correlation between how much of the work students did and how well they kept up with the course work. And while final grades are not available to me, it will come as no surprise that the average midterm exam score was a "C."

The viewer's guide was the least used of all the material, and tied with the supplemental reading for "least valuable" ratings. Programs were ranked as the most valuable element in the course, followed closely by the text. This is interesting in view of the fact that 20% of the students got through the course having viewed "few or none" of the programs. The value ratings were not consistent with the actual usage of the materials.

Also significant is the fact that, while only 54% viewed all or most of the programs, only 2% of students said they'd done little or none of the text reading. In other words, it was quite possible to approach the course as if it were a correspondence course rather than a telecourse. As proof of that, while I watched the first half of the programs, after midterms I didn't have or make time to get in and watch the videos—and I still got an A in the course, having missed half of the programs.

But when asked if the course would have been as valuable without the programs, 4% said yes, and a full 88% said no—confusing in view of the fact that only a little more that half of the students had watched most of these valuable programs.

Still trying to narrow down exactly how important a role the programs played—and what the nature of that importance was—I asked students if they would have gotten as much from a regular classroom course. The issue got murkier: 54% said no, 8% said yes, 4% added their own "maybe" category, and the rest were abstentions.

I tried a different tack; I asked if they would have gotten as much out of the programs alone: 78% said no, 6% said yes, and there were more mysterious abstentions.

Would regular classes benefit from video supplements? Ninety-four percent said yes. Did they think a trend to telecourses would be a good thing? Ninety-two percent said yes.

Would students rate the programs as the best thing about the course? No. Freedom and convenience took top place with 75% of the votes, and programs followed closely. As for the worst things about the course, written assignments topped the list with 35%,

followed by "impersonality" with 28%, and "self-discipline" with 20%. A quarter of the students said they liked everything about the course—including the impersonality.

Impersonality had been the prime complaint of the instructor himself, and he had predicted it would be a major drawback with students as well: 48% agreed with him, 52% said they didn't mind the lack of personal contact. A couple of them penned in the margin that if they were taking *only* telecourses, they would miss the people contact, but that they had enough on-campus courses to satisfy those needs.

The last question tried to get at the issue of what made the students rate the programs as so valuable. Would their responses support the couch-potato thesis for the attraction of television? Seemingly not, because the course work was comparable to that of a regular course. Ten quizzes, two lengthy exams, and two to four written assignments is, if anything, more than is normally required in a sophomore level class.

Were the courses rated as valuable because of such tangibles as their information content (high) or their role in clarifying and reinforcing the text? Not a single student rated either of these considerations as the primary value of the programs. Furthermore, most students hadn't even watched them all, and none of the quizzes, exams or written assignments drew on any elements from the programs. As mentioned earlier, it is possible to do well in this course without ever viewing any of the programs. So why did the students rate them so highly, as being so valuable? They were virtually useless in terms of being necessary to success in the course.

For myself, I've forgotten any specific bits of information from the programs. I'd be hard-pressed to dredge up declarative knowledge from the course text, either. But I remember the images, and I remember how they made me feel.

And when it came down to it, 80% of the students identified the primary value of the programs as "bringing the subject matter to life," with another 30% selecting "allowing me to feel closer to people of different cultures."

The reasoning behind the question was that if people were relatively untouched by the programs, they'd be more likely to assign some practical value to the programs. If people *were* affected in ways similar to myself, they'd be more likely to pick one of the intangible, feeling-oriented responses. (It should be noted other options were available, but no one selected them.) In fact, the responses supported the notion that television's power as an educational tool lies in its realism and ability to make viewers *feel*, to give a damn about the subject. It is thus not surprising that the quality of programs is an all-important element.

But an equally important—and absent, in this course—element to effective use of videos and television viewing is the integration of the program into the course as a whole. It should not be possible to do well in a telecourse without ever viewing a program; it defeats the purpose and potential of video education.

The Cultural Anthropology instructor, Bob Mack, conceded that he was uncomfortable with the television medium, and that his bias probably showed itself in his lack of emphasis on the programs in terms of questions on the quizzes, and written assignments. This was interesting, because two of the survey respondents added margin notes to the effect that while they thought the programs were valuable and enriching, they had not taken advantage of them as they felt they should. This was exactly what I'd noticed myself; there was no reason to watch the programs beyond personal satisfaction. I let the viewing slide because it wasn't essential to doing well in the course.

Mack said that if he were to do it over again ("which, thank heavens," he added,

"I won't have to do,") he would emphasize the viewing more, including more questions on quizzes and tests that would require program viewing, or perhaps basing a written assignment on some aspect of the programs, to increase the incentive of students to keep up with the viewing. Mack also admitted to not having viewed all the programs himself.

Moss discussed this point in his book. "Only when teachers are fully conversant with the content of a series can they consider incorporating it into a scheme of work and exploiting it fully."[13]

It's interesting that the people who are the least enthusiastic about telecourses are instructors. Bob Mack was typical when he said, "I feel more like a manager than a teacher." The single biggest complaint of instructors was the lack of interaction. The students, for the most part, didn't miss it terribly, but teachers felt cut off.

Several of the instructors stressed the value of some kind of relationship with students, so they're not just anonymous names on mailed-in quizzes, and so problems in comprehension can be brought up and addressed. Most also felt a need to discuss and elaborate on the text and programs. I noticed a sharp contrast between the uncritical, noncontroversial approach of the text and programs, which tend toward blandness and avoiding the rocking of boats and ruffling of feathers, and the more antagonistic and critical approach that often occurs in a classroom, as issues and questions are raised and debated.

I believe the instructor's need for feedback and contact exceeds the student's need—but then, the typical telecourse student also has on-campus courses, whereas some instructors have only telecourses. When meetings *were* held on campus, only a quarter to a third of my classmates showed up for them, and of those who did, few asked questions.

This is a problem seldom discussed in literature, but the sense of alienation of instructors seems to be a real concern.

Another question worth addressing, seldom examined, is an analysis of what *kinds* of subjects are most amenable to the telecourse format. At exams, which are administered to all telecourse students at once, I had the opportunity to talk to students in other courses, in addition to having combed the course evaluations in the telecourse office files. I was struck with how much less satisfied students of some courses were than others.

Television is a visual medium, and an emotional one. Accounting is neither a visual nor emotional subject and, like speech and writing, is learned primarily by practice. As such, it's not particularly amenable to the telecourse format, and in fact accounting telecourse students voiced much less enthusiasm for telecourses than did students in the highly visual and emotional anthropology course, or such social science courses as "War: A commentary," "The Africans," "The Mind," or "The Brain." It's also no coincidence that these are all among the best programs available in telecourses, whereas the accounting series is rather lacking in pizazz.

Given television's potential to "bring subjects to life," I wonder if telecourses might not be the best possible format for subjects often accused of being lifeless and dull, such as history, art appreciation, music appreciation, theatre and telecommunications. None of these are currently offered via telecourses at UAA, though several students added notes to their surveys to the effect that they'd like to see such courses offered.

Other courses might benefit from a strong visual element, if not actually a telecourse format per se. For example, biology and astronomy and physics and geology

would benefit from strong supplemental video material. This is something often overlooked. Video and classrooms can be mixed in varying degrees; it doesn't have to be an either-or proposition. What is essential, though, is that the programs need to be of good quality, and their use had to be well-integrated into the course as a whole. Viewing them should be immediately followed by discussion, or written responses, or some means of getting the students actively involved and processing the program contents.

Likewise, it's probable that telecourses would benefit from greater interaction and student participation, though that would detract from their virtues of freedom and flexibility.

While there is little research to support the notion, it seems possible to me that the effectiveness of telecourses might be enhanced by offering a telecourse on visual literacy; encouraging critical viewing skill, and in effect training telecourse students how to be not only telecourse students, but more critical viewers in general.

The importance of extrinsic motivation also emerges as an important consideration in successful video education. Solo learning makes substantial demands on self-discipline, and those demands seem too great for many students. Ideally, telecourses should be very well-structured, and the materials necessary to coordinating the learning process need to be as clear and well-organized as possible. At the very least, due dates would be helpful!

One of the keys to effective use of the telecourse format is effort on the part of the student. I found it interesting that while written assignments led the list of "worst things" about this course, it is precisely that kind of intellectual effort on the part of students that allows telecourses to work as a learning format.

To sum up, then, it seems evident that telecourses depend not only on the quality of the programs and suitability of the subject matter, but also on how well these are utilized and integrated into the course as a whole. Active involvement of the students is a necessary ingredient, so that the text and programs will have maximum effect. As some of the programs currently available in telecourses demonstrate, production excellence is possible. Now it remains to figure out how to harness this potential force in education.

ENDNOTES

[1]D. Cohen, The Effects on Learning and Perception, Growing Up on Television: A Report to Parents (New York: McGraw-Hill, 1980) 38.

[2]R. Moss, Video: The Educational Challenge (London: Croom Helm, 1983) 128.

[3]P. M. Greenfield, Mind and Media: The Effects of Television, Video Games, and Computers (Mass: Harvard University Press, 1984) 6.

[4]L. Masterman, Teaching About Televison (London: MacMillan, 1980).

[5]Greenfield, 79.

[6]Ibid., 68.

[7]Ibid., 80

[8]Ibid., 85.

[9]Ibid., 25.

[10]N. Postman, Amusing Ourselves to Death: Public Discourse in the Age of Show Business (New York: Viking-Penguin, 1985) 80.

[11]Moss, 35.

[12]Greenfield, 70.

[13]Moss, 40

BIBLIOGRAPHY

Audiovisual Instructional Service and the Center for the Study of Instruction. Inquiry: Implications for Televised Instruction. New York: National Education Association Publication, 1969.

Diamond, E. The Tin Kazoo. Cambridge, Mass.: M. I. T. Press, 1975.

Ford Foundation and The Fund for the Advancement of Education. Teaching by Television. 1959.

Gana, F. Z. "Distance Education: A Nigerian Perspective," Educational Media International. 23, 2 (1987): 13-16.

Labrada-Rubio, F. "Television Archives and Education," Educational Media International. 23, 2 (1987): 24-27.

Lipson, J. "Vicarious Versus Direct Experience: How the Media Affect Psychologicial Growth." Educational Media International. 23, 1 (1987): 31-37.

McLuhan, M. Understanding Media: The Extensions of Man. (New York): McGraw-Hill, 1964.

Meyer, R. "Twenty Years of Media Education in France." Educational Media International. 23, 2 (1987): 67-70.

Paiyio, A. "Imagery as a Private Audio-Visual Aid," Instructional Science. 9, 4, (1981): 295-309.

THE RIGHT MOVES

Tara C. Wreyford

When I was twelve I tried to kill myself. I guess I'd thought about doing it lots of times. Then I read in the newspaper about this kid they put in the j.d. lockup for crazies and how he hung himself with his belt. He was dead when they brought him his dinner. I don't remember now exactly what they said he did to be there in the first place, but he didn't make any trouble. There was a big stink later and because they hadn't taken his belt away when they locked him up, they wouldn't let any of the kids have so much as a shoelace in lockup. They even had cameras that watched whenever you went to the bathroom. I got to thinking how Vince was always watching me like that.

God, I remember being in the kitchen making dinner and thinking about that kid. I wondered if he'd thought about doing it for a long time and how if I was going to do it, that I had to do it then before Vince got home from work. Mama had left that morning to go to Little Rock for the weekend to help Aunt Velma out after her female surgery, so that just left Vince and me. I'd begged Mama to let me go, too, but she said I'd just tire Aunt Velma out. She'd said I needed my rest, too, so my asthma wouldn't act up and that was better gotten at home where Vince could take care of me. I'd wanted to tell her then that I couldn't get any air when Vince was around, but it wouldn't have done any good. She never would've believed me. She wouldn't even have listened. She probably would've called me a liar like she did my daddy, 'cause she always said I was his spitting image and I knew she didn't mean that was a good thing. With me, though, she just said I made up too many tales. Maybe I did sometimes. Sometimes it all got confused in my head.

I was thinking how it was only gonna be Vince and me while Mama was gone. Oh God, I was thinking and thinking about that kid and how nothing would have changed his mind. It was just gonna be me and Vince alone. I ripped through Mama's drawers and got some of her stockings and tied them together tight. Then I made a noose and put it around my neck. I pushed a chair up underneath the wood beam that ran across the kitchen ceiling and tied the other end tight to it.

Weird, I know—but I thought about this doll a girl named Grace brought to "show and tell" when we were in second grade 'cause she thought the doll was real grody. She called her "poor pitiful Sue" 'cause she was kinda raggedy and dirty where the dog had chewed on her. She only had part of one arm left from one time the dog got her, and she'd lost an eye and part of her hair from another time. I looked at that doll's one sad eye, and I wanted to take her home and fix her up, but Grace wouldn't let me. Grace said she was gonna give the doll to the dog. I got mad and called Grace a pig. She hit me first, but the teacher just saw me when I hit her back. So I got sent to the principal's office. I told him what happened, but he said that I couldn't have a good enough excuse no matter what for hitting anybody. He made me stand against the hallway wall for a half an hour with my nose in a chalk circle. When I went back to class, I had to tell Grace I was sorry. The teacher made her say she accepted my apology. But

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when the teacher wasn't looking, Grace said she was still going to give Sue to the dog. I thought about stealing her if Grace ever asked me to come over but she never did. Nobody did.

For weeks I couldn't stop seeing Sue's one cloudy blue eye fixed in my mind like she knew me and I knew her. I even wrote a poem about her, "Poor pitiful Sue, I'm just like you. Nobody loves me, too." Like some dope I cried and cried when I wrote it. I took the poem to school and hid it in my desk, but my teacher found it one day when us kids were at recess. "It's a very nice poem, Callie," she said and gave me a note to give to Mama that she'd folded and scotch taped. I had this deep down feeling, though, that she didn't really believe it was nice. I didn't want to show the note to Mama, but the teacher told me I had to get it signed and bring it back the next day. I got sick to my stomach walking home and had to throw up.

When Mama read what the teacher said, she got real upset about it. "Callie, the teacher says you been fighting with the other kids and moping around. Now she says you wrote some little something about being unhappy and she wants me to come to school and talk to her. I don't know what your problem is, but I don't feel up to running to school for things like this. I'm just so tired of worrying about you all the time. I can't be doing it by myself. I'll see if Vince can go in. He can get Jerry to cover the restaurant for him." Her mouth made a tight disappearing line like it did whenever I'd done something I shouldn't have. Which seemed to be most of the time.

"Mama, please don't send Vince. I won't do it again. I won't do anything else. I promise. Mama, don't send him. He'll just get mad at me," I pleaded with her. So, she didn't tell him that time and she wrote the teacher a note that she'd had a long talk with me and I wouldn't be making any more trouble at school.

And, I hadn't either. I hadn't even thought about the doll for a long time until right before I tightened the stockings around my neck and prayed, "Dear Jesus, forgive me for all the times I've messed up and please don't let Mama be mad at me too long." Then I stepped off the chair. It hurt bad for a minute, but it seemed like I could smell Mama's perfume on the nylons as I passed out.

I didn't exactly see my whole life go by like they say people who drown do. But parts of it seemed to be happening right then. Only it's like a dream where parts of it are all mixed up. And you can't tell what's supposed to be real and you can't wake up.

I remembered Mama's long hair like she had it when I was small. How she'd rub my forehead to calm me. How when she'd kiss me her hair'd fall over my face like a soft cloud and how it always smelled fresh like honeysuckle.

But she cut all her hair short after Daddy took off with some 18-year-old girl he knocked up, and she never grew it back long. Not even for Vince.

Her marrying Vince was my fault. I guess she couldn't stand it just being me and her and the silence when Daddy left. It was my fault, too, that Daddy took off. No matter what anybody said, I knew it. I could tell every time Mama looked at me. She didn't want to talk about it, but once in a while when she'd stare right through me she'd say, "Callie, you're so much like him."

I never did tell her that I missed Daddy's beer batter flapjacks that were as big as the skillet and the way he whiskered my tummy, even when he got so carried away that I'd laugh so hard that I'd start to wheezing. But that was just Daddy, and I didn't mind. Daddy liked to have fun. Next thing I knew Mama would send me to my room and she'd be going at Daddy about how he was going to ruin me and wasn't it bad enough

she could smell the whiskey and women on him.

There were plenty of times when I was little that Mama and Daddy would have a set to and Mama would holler her head off. Daddy'd usually bang out of the house and stay gone for a day or two. But he always came back. When he did, he'd make for Mama like he was real sorry for being such a jerk. "Angel, don't nobody do for me like you do. Come on, gimme a smile and a little affection here." Pretty soon he'd have Mama sitting in his lap and he'd wink at me, "See here, Callie girl, me and your mama got some making up to do." Then they'd head on down the hall and lock the door to their bedroom.

When they came out, Mama's hair would be kinda soft and ruffled up like when you first wake up in the morning. She'd go to brushing it out and Daddy would take the brush from her and stroke it in long, slow pulls. I couldn't ever get enough of watching them like that. I'd try to stretch out the sweetness by holding my breath 'til my heart would start to pounding. Sooner or later, though, they'd catch me watching and shoo me off to bed. But I never forgot how they looked at each other like that was all there was in the world, that aching and wanting. I never forgot.

I wished it could've been like that more and it might've been if I hadn't always had such lousy timing, at least that's what Mama and Daddy said. It should've been like the nursery rhyme, "First comes love, then comes marriage, then comes mama with the baby carriage." Only I kinda came along like the cart before the horse.

I wasn't ever an easy baby. I was scrawny, ugly red, and colicky, Mama said, always having to be taken to the doctor. I had to sleep between Mama and Daddy when I was little or I'd wake up with screaming nightmares. When they'd put me in my own room, I'd dream about monsters eating my words 'til I couldn't get any air. Daddy'd come in and sit on the side of my bed and pretend to spoon my words back into my throat with my medicine. "Tell me, little bit, ain't you never gonna let me and your Mama sleep alone through the night?" he'd say.

When I started kindergarten, Mama and Daddy said it was time I grew up and stayed in my own bed. Before bedtime Daddy'd sit me in his lap in the rocker and tell me stories about leprechauns who watched over little girls and foolish daddies and gave them magical powers. If I closed my eyes, I could imagine green fields and flowers encircling me in sleep. But, I could always tell when Daddy'd put me in the bed and slip out, and sleep came harder afterwards.

I didn't get along at school 'cause I got real tired when I played, and I had to see more doctors. "Wheezy Snot" the kids called me. Asthma, Mama said. "She got that from your family, Carter. Where are we gonna get the money for all the bills? We can't get ahead for anything." Mama's voice would get real high, and I'd be afraid she was gonna cry. I'd try not to get sick, but I didn't seem to be able to do anything about it.

Mostly Daddy didn't seem to get too mad about my asthma, but sometimes when Mama got to hollering it seemed to get to him more. "You act like it's my fault we got a sick kid. You're the one who got pregnant. You're the one who's always bitching me out. Godammit, get off my case," Daddy said.

Daddy started putting in overtime. Most times he didn't even come in 'til I was down for the night. I used to pray he'd come in and kiss me goodnight, but he didn't anymore. I asked him about it once. He said he didn't want to wake me. Once in a while, though, he'd open the bedroom door and I could see him, dark against the light, his big shoulders bent. Then he'd shut it, and it was darker than before.

When I was six, Daddy just didn't come back. He quit his job. He quit Mama. And, he quit me. Mama took a job at the restaurant 'cause there was never enough money. She left me at home a lot and when she was there she mostly wanted me to be good and quiet, so she could soak her feet in epsom salts, gulp three or four aspirin (depending on how bad the migraine was), put the heating pad to her back, and the ice pack to her head. I didn't talk about Daddy or it made Mama's head worse. But not talking only meant I thought about it more.

One night she told me she was bringing a new daddy around for me and as how Vince would be the making of me.

What's to say about Vince except his smile never made it to his eyes, and when Mama wasn't looking he rubbed up hard against me. But, he made all the right moves. He showed up every Sunday and took us to the church where he taught Sunday School. After church he'd take us to the restaurant and cook us up some burgers and fries. Then he'd put me to washing dishes for the next couple of hours—just to keep the business in the "family." When I'd pull my hands out of the bleach-filled, scalding water, he'd shove 'em back under and say, "Gotta get tough, kiddo. Nobody gives you nothing in this world. The Lord helps them that help themselves." Then he'd fix that hard smile on me and swat Mama on the butt, "Ain't that right, Shirley? Besides, breathing that steam in is good for the girl."

"Guess so," Mama would mumble. I thought she might've been afraid of Vince, too. Because when he was mad, Mama hardly spoke up at all, but she acted less and less like she cared one way or the other. "I'm sorry, Vince," she'd say, or "Tell Vince you're sorry, Callie. You won't do it again."

Vince moved us into his big old house. My room was way in the back far away from Mama, so she wouldn't have to be running in there all the time, Vince said. He said it was high time I stopped being a whiner. I started having my nightmares real bad, but when I'd feel a scream coming on, I'd stuff the corner of the pillowcase in my mouth and bite on it so Vince couldn't hear me. If he could hear me, he'd tell Mama not to baby me, that he'd take care of it. Then he'd come in my room and he'd lay down on top of me. Once after he covered my body with his he said, "Can you get you some air now? Ask me pretty please to give you some air." Then he covered my mouth with his, and I couldn't breathe. When he finally pulled back off of me, he twisted my nipples hard. "These are your on and off buttons, kiddo. And, from now on when I turn 'em you're gonna do what I want, 'cause if you don't, I'm gonna beat the holy crap out of you," he said.

No matter what, though, I couldn't do anything right. If the dishes weren't clean just so, he came. If my grades weren't good 'cause I couldn't sleep and missed too much school, he came. If I didn't talk much at the dinner table, it was 'cause I had a "bad attitude" and he had to teach me right from wrong.

"It's no wonder your old man dumped you, kiddo," he said, "you're fucking good-for-nothing. All I done for you and you don't even call me Dad or show me no respect. It's not natural. The Good Book says you got to honor me. Roll over now."

After a while, when he came, I'd go inside myself and be very quiet. I'd look at the tear in the wallpaper over the picture of the sorrowful Jesus, and I'd crawl deep, deep inside of the wall where he could not find the real me. But then I could not find me either. It seemed like I was in pieces and parts on a field running with blood.

I got the idea that the only way to put me back together was to get Vince out

of my life. I didn't want to hurt Mama, but I thought long and hard over how much unhappiness I had caused her by even being born. She didn't seem to mind so much anymore that Daddy was gone, so she surely wouldn't mind me going, too. At least I wouldn't always be reminding her of him. I wanted to believe that she'd miss me some, though. That made the whole idea easier, because *I'd be making the right moves for once.* Then that's when I took Mama's stockings from her drawer and did what I had to do.

I remember a bad nightmare afterwards and my throat hurting worse than it ever had. I couldn't get any sound out at all and my mouth was thick with a salty taste. As I drifted in and out of the light, I could hear Mama crying. I thought I heard Daddy, too. I could feel Mama and Daddy aching and wanting. This time, though it was for me.

"Vince is gone, Callie. Oh God, don't take my child away. I love you," Mama whispered.

"I'm here, and I'm always going to be here for you, baby, I promise. You've gotta give us both a second chance. Give yourself a second chance. Don't die," came Daddy's voice.

"Too late," I thought and must have said. "Not too late," came an answer from out of my body, but somehow from within. I could swear I smelled honeysuckle.

Maybe that's just the way I imagined it should be, though. Maybe Vince found me slumped against the cabinet half-breathing before anyone else could. Maybe he told me there were things he could do to me worse than sucking all the air out of me if I told. Maybe I wasn't any good at dying. Then.